

# PAMI

Innovative Solutions  
for Agriculture and Beyond

## 2012-13 Annual Report

*Strengthening Roots, Branching Out*

# What is PAMI?

**PAMI = Prairie Agricultural Machinery Institute**

PAMI is

- an ISO 9001:2008-registered and ISO/IEC 17025:2005-accredited applied research, development, and testing organization serving agriculture and industry in Western Canada and beyond.
- a farm-technology leader serving the agricultural sector by providing independent, third-party farm equipment evaluation and development, spurring technological advances in all areas of traditional farming practices.
- a prairie-rooted organization located in Humboldt and Saskatoon, Saskatchewan, and Portage La Prairie and Winnipeg, Manitoba.

PAMI's diversified engineering expertise has direct application for other sectors including transportation, military, aeronautics, forestry, and mining.

PAMI services include design; development; prototyping; evaluation of vehicles, machinery, and components; value-added process reviews; pilot plant design; and optimization.

## Year at a Glance

### Ag Development

- 27 Projects
- \$3.9 million value
- \$52 million economic impact\*
- 143 jobs created/maintained

Areas of work:

- Crop production machinery development

### Ag Research

- 57 Projects
- \$2.6 million value
- \$50 million economic impact\*

Areas of Work:

- Crop production machinery and systems
- Bioenergy products and processes
- Beef cattle and forage production systems

### Ag Partnerships

- Service on committees and boards
- Industry consultations
- Helping explore new opportunities in agriculture

\* Economic estimates made by PAMI

### Strategy

- Completed 68 tactical actions toward our six strategic directions.
- Critical areas of progress:
  - reach and exposure within our governments
  - alignment with provincial priorities
  - multi-centre execution of core-region projects
  - scope of economic analysis activities
  - new technical offerings in our core areas: spray technology, beef and forage demonstration
  - exploration beyond our core; mining sector, small/medium enterprises

### WESTEST

- 23 Projects
- \$0.6 million value
- \$8 million economic impact
- 22 jobs created/maintained

Areas of Work:

- Machinery and vehicle development

### Learning and Growth

- 11 per cent growth in staff
- Significant investment in organizational development, and in technical and safety training.
- Continued development as employer of choice.

### Information Services

- Technical articles, summary research reports, scientific papers, and posters
- Conferences, seminars, producer events, Field Day
- Website updates



## *Prairie Agricultural Machinery Institute*

# **Annual Report 2012-13**

### **Table of Contents**

Letters of Submittal	2
Chairman's Message	4
President's Message	5
Strategic Direction	6
PAMI Highlights:	
Introduction	7
Crop Technology Development	8
Bioenergy and Products	15
Western Beef Development Centre	20
Industry	25
WESTEST	30
Outreach	31
Our Projects	32
Our People	33
Financial Highlights	34
Management Report	35
Auditor's Report	36
Financial Statements	37
Notes to Financial Statements	42
Schedules	50

# Letters of Submittal



Honourable Lyle Stewart  
Minister of Agriculture  
Government  
of Saskatchewan



Honourable Ron Kostyshyn  
Minister of Agriculture, Food  
and Rural Initiatives  
Government of Manitoba

## PAMI

Innovative Solutions  
for Agriculture and Beyond

Humboldt, Saskatchewan  
June 28, 2013

The Honourable Lyle Stewart  
Minister of Agriculture  
Government of Saskatchewan

The Honourable Ron Kostyshyn  
Minister of Agriculture, Food and Rural Initiatives  
Government of Manitoba

It is my honour to present the annual report of the Prairie Agricultural  
Machinery Institute for the year ended March 31, 2013.

Respectfully submitted,

Tim Oleksyn  
Board of Directors Chair  
Prairie Agricultural Machinery Institute



**Saskatchewan  
Ministry of  
Agriculture**

June 28, 2013

The Honourable Vaughn Solomon Schofield, S.O.M., S.V.M.  
Lieutenant Governor,  
Province of Saskatchewan

Your Honour:

I have the honour to submit the annual report of the Prairie Agricultural Machinery Insti-  
tute for the year ended March 31, 2013. It includes the financial statements audited by the  
Provincial Auditor.

Respectfully submitted,

Lyle Stewart  
Minister of Agriculture  
Government of Saskatchewan



# Prairie Agricultural Machinery Institute



## Board of Directors

Above (from left):

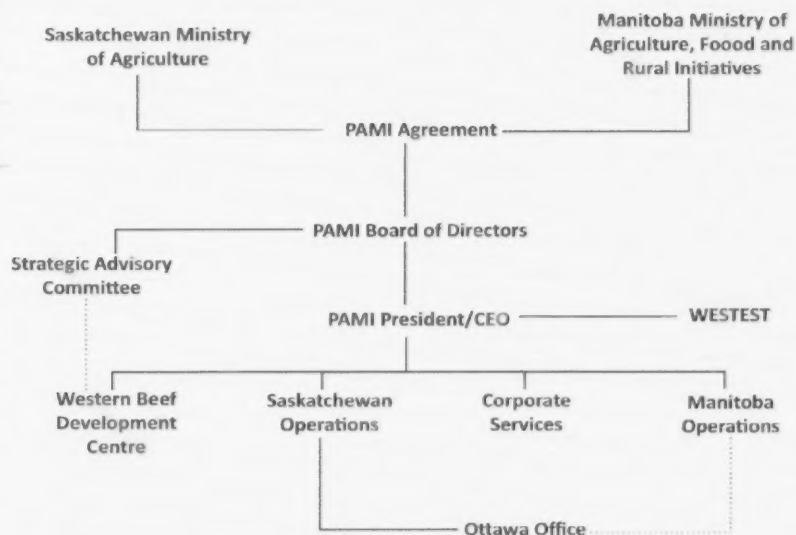
- Boris Michaleski, Manitoba Producer;
- Dr. Tracy Gilson, Representative of Manitoba Agriculture, Food and Rural Initiatives;
- Bryan Hadland, Saskatchewan Producer;
- Tim Oleksyn, Chair, Saskatchewan Producer;
- Dr. Abdul Jalil, Representative of the Saskatchewan Ministry of Agriculture;
- Jerry Engel, Representative of Agricultural Manufacturers of Canada;
- Bill Zettler, Vice-Chair, Manitoba Producer

## Corporate Management Team

- David Gullacher, President/Chief Executive Officer
- Joanne Forer, Vice President, Finance and Administration
- Harvey Chorney, Vice President, Manitoba Operations
- Dr. Paul Jefferson, Vice President, Western Beef Development Centre
- James Wassermann, Vice President, Saskatchewan Operations

# PAMI

Innovative Solutions  
for Agriculture and Beyond



# Chairman's Message

Tim Oleksyn



PAMI was planted in agricultural soil. Like a seed that has been nourished, watered and tended in fertile black earth, over the past nearly four decades, PAMI as an organization has developed, broken through the topsoil and branched out in new directions. But our roots remain firmly anchored on the farm.

PAMI is celebrating both our roots and our branches in 2012-13, and this annual report provides a snapshot of just some of the work that has been done this year – for the agricultural industry and in other sectors like ag-related bioenergy projects, and ones as far afield as national defence, fulfilling our vision of providing “Innovative solutions for agriculture and beyond.”

In order to know where you're headed, you have to know where you've been. In the fall of 2012, PAMI looked back, taking the time to identify The Big-4; the innovations in machinery that have had the biggest impact over the past 35 years. PAMI has had an impact on all of the Big-4 machines in the past, and we see all of them in our future as we look to find ways to improve machinery and better production from the Canadian prairies.

PAMI is constantly striving to lead the curve when it comes to technology, and at the same time, draw on producers and partners to ensure the technologies being developed are meeting their needs.

Over the past year, PAMI has met with many people, from provincial Ministers of Agriculture and senior personnel with the Department of National Defence to top producers and researchers. The decision-makers we've brainstormed with have helped to strengthen collaborative thought processes and will help lead us into the future of agriculture and beyond.

PAMI truly is a unique organization and we continue to build on this uniqueness. Our funding formula, which includes monies from Saskatchewan and Manitoba governments, creates synergies when it comes to agricultural research. The collaborative work done by PAMI ensures that research isn't duplicated, but rather augmented by its cross-provincial structure.

The PAMI board has focused on making strides towards attaining our strategic goals identified two years ago.

Those strategic goals included raising PAMI's profile, maintaining financial stability and growth, diversifying our client base, encouraging longer-term contracts, strengthening existing partnerships, and becoming a leader in terms of human resources.

We continue to meet these goals, and while there are things on our list that we have yet to accomplish, we are moving forward.

I am very grateful to the PAMI Board of Directors for the wealth of wisdom they bring to the governance of the organization. This group of people is very diverse, extremely committed, and provides strength to this organization. With a slate of experienced directors this past year, the board has their feet under them, and the direction we have chosen to guide PAMI toward is both sound and strengthening.

Thank you to the WESTEST Board of Directors for the privilege of helping with the operations of this highly specialized testing organization. And thank you to the Strategic Advisory Committee of the Western Beef Development Centre for their dedication and hard work over the past year which has strengthened both organizations. The WBDC advisory committee continues to address the changing needs in the beef and forage sectors. I appreciate those who have been involved in the WBDC, and while some members of the board have had to step away, they are still called on for their wisdom regularly.

In partnership with the board, PAMI's staff and Corporate Management team are the anchors of the whole organization. The texture the people of PAMI bring to the organization — with their backgrounds which range from grassroots farming to research expertise — is key to moving this organization forward. I am so passionate about the role the staff plays in PAMI. I feel they are of the utmost importance, and are a definite key component to the organization.

In closing, I thank the Governments of Saskatchewan and Manitoba for their support of PAMI, and recognize the Honourable Lyle Stewart and the Honourable Ron Kostyshyn, the two Ministers of Agriculture for Saskatchewan and Manitoba, respectively, for this bi-provincial collaboration.

Things are changing rapidly in the world of agriculture right now, and PAMI is addressing those changes. PAMI's role is not to be reactionary, but to use our collective expertise, contacts and wisdom to look to the future.

# President's Message

David Gullacher



*Strengthening roots, branching out* really describes our development and growth in 2012/13, as well as our progress over PAMI's nearly 40 years. There are many provincial research organizations across Canada. But there are very few if any that are bi-provincial in nature and serve two provinces simultaneously. While some would look on that as a complex task, we look for the synergies and see a real multiplied return to each province's investment. I, as well as our executive and staff, join our Chair and board in thanking the provinces of Saskatchewan and Manitoba for their continued collaboration in this bi-provincial research organization, and for the tremendous privilege of working for PAMI.

In this annual report, we talk about client work as providing the lifeblood of PAMI, and about projects as being the organization's pulse; and truly they are. We conducted nearly 190 projects across our fields of science and engineering this year. In every one of them we were directly accountable to at least one client and at the end of the day, they marked their satisfaction with our work overall, at 88%. None of our centres scored less than 80% and one scored 95%!

Having the right equipment, skills, and knowledge go a long way to providing excellent work. But in science and engineering, there are two key ingredients needed to go the whole distance, and they are called *can do* and *will do*.

*Can do* encapsulates the attitude that hallmarks PAMI's people; we'll brainstorm and we'll build on each other's creativity until we find an innovative solution.

*Will do* is what's needed when success comes down to 10% innovation and 90% perspiration. Our people excel by doing the less glorious things that are necessary to get the job done.

We understand the need for these ingredients, and we applaud our staff for bringing them to work every day.

For our part, we strive to excel as an employer, providing an excellent, rewarding, and sustainable career experience for every one of our staff, every day.

As we focus on the future we understand what we need to do to align with our provinces' aims. We can and we will strengthen our roots and branch out, and in so doing, we will have a key role in developing prosperity in agriculture and beyond.

A stylized handwritten signature in black ink, likely belonging to David Gullacher.

# Strategic direction

## Vision

Innovative solutions for agriculture and beyond.

## Mission

To enhance sustainability and profitability in agriculture and other sectors through research, innovation, adaptation, and knowledge transfer.

## Objectives:

- Pursue initiatives that evaluate the economics of new technologies, explore renewable energy solutions and bioresources, discover environmental technologies, reinforce organizational knowledge of agricultural machinery, and cultivate technology innovation.
- Continue to enhance PAMI's profile to rebrand the organization as an agency with broader impact and potential.
- Increase public visibility and communications to facilitate project opportunities and foster third-party learning.
- Continue to enhance our financial stability and growth.
- Continue to develop a human resources strategy that positions our organization as a leader in the local community and as an employer of choice.
- Continue to develop our capital base to facilitate growth.



# PAMI Highlights 2012-13

In order to understand the highlights of PAMI's accomplishments during the year, it will be helpful to know the nature of PAMI's role, and how the organization has molded its character — from its culture and values to its operating disciplines — in order to succeed in this role.

PAMI is a contract research organization. As such, it has assembled teams with tremendous talent in their fields. These teams conduct all of PAMI's science and engineering work in the form of projects. Each project has clear objectives, timeframes, and budgets. And each project has at least one client or customer to whom PAMI makes itself accountable. Some projects take only a few days or weeks to conduct, while others may continue for three or four years. Working for clients is the lifeblood of PAMI, and the pace of projects is the pulse of PAMI.

PAMI conducted 84 projects this year in agricultural research, development, and demonstration. This is PAMI's core area of expertise and its fundamental role.

Some of these projects were funded by government agencies and producer organizations. The results will be disseminated for broad economic impact in the agricultural sector of Saskatchewan, Manitoba, other regions of Canada, and the world.

Other confidential projects were conducted under funding by specific agricultural manufacturers. Those project results are held in confidence for the competitive advantage of the funding organizations, but they will enable new machines or processes that will in turn provide economic impact in the agricultural sector here.

Overall, PAMI's research, development, and demonstration activities will help to provide an annual economic impact in our region estimated at over \$100 million. The following pages highlight examples from among PAMI's key accomplishments this year.



# Crop Technology Development

PAMI has long been devoted to providing farmers with information and innovative strategies that contribute to successful farming operations. Most farmers likely know PAMI for the equipment reports produced in the organization's early years. While those reports have become a thing of the past, PAMI continues to work for farmers by testing and designing new equipment, and supporting value-added initiatives for developing sustainable crop production practices. Whether publicly or privately funded, each project we undertake is with the objective of benefiting the farmer – by developing better equipment, researching new crop or harvest technologies, or by delving into the best application process for fertilizers.

PAMI's objective is always to work towards the most efficient and cost-effective solutions for each client. Over the past year, PAMI has provided development assistance to private clients in a variety of ways in terms of crop technology.

## The BIG-4

From a small organization that focused primarily on agricultural machinery testing, PAMI has expanded its capabilities into the defence, energy and transportation fields. However, they remain close to their origins on the farm by continuing to lead the way in agriculture-based research and agricultural technology development, in some instances for broad public knowledge and good, and sometimes for the competitive advantage of private clients.

In the fall of 2012, PAMI explored the development of farm technology; namely The Big-4 – those machinery innovations over the past 35 years that have contributed to building the prairie region's grain and oilseed industry. At the same time, PAMI explored the future of the agriculture industry over the next 10 years by speaking with producers at a special visioning session.

The idea of focusing on The Big-4 came from Dave Gullacher, the president and CEO of PAMI. While PAMI



*Crowds and machinery alike gathered at PAMI on November 1 to hear about The Big-4 innovations in agricultural machinery over the past 35 years.*

*Saskatchewan Agriculture Minister Lyle Stewart spoke with reporters during the event at PAMI on November 1.*



has, in recent years, moved out into the wider world in terms of research projects and development, they have not forgotten their agricultural origins. Coming up with a list of the machines

that have had the biggest impact on the industry over the decades of PAMI's history would pay tribute to those roots and to PAMI's role in machinery development.

*PAMI crews have traveled around the world — across the prairies, throughout the U.S., Europe, South America, and Australia — testing and developing the combine harvester to make it the universal machine that it must be.*

Without the Big-4, Saskatchewan and Manitoba would not be the world-class agricultural producers they are today. And reviewing the development of the Big-4 gives us a clearer picture of the path of modern agriculture, from past to future, PAMI believes.

First of the Big-4 is the zero-till air drill — the very best dry-land seeding equipment in the world, produced by the Canadian Prairie region. Unceasing progress ever since the 1980s has made this technology what it is today.

PAMI had a role in developing this technology by working with other researchers to explore soil openers, fertilizer placement, packing and agronomic management. PAMI then helped disseminate the results in an instruction manual for rapid, sure-fire implementation.

Second of the Big-4 is the tractor, which has seen tremendous advancements in terms of size, power, traction, navigation, emissions, operator comfort, and safety.

PAMI and its Alberta associate, the Ag Technology Centre, played a role in many of the tractor's advancements through research, development, testing, and demonstration.

Third of the Big-4 is the sprayer, as pesticide application has ballooned

along with crop genetic engineering, resulting in some highly effective crop production packages.

Applicators have undergone huge changes in order to meet the increasing demands for speed, safety, navigation, and efficacy. Historically, PAMI had a role in the research and testing of sprayers, looking at spray drift and other engineering attributes.

Spraying continues to be an area PAMI is watching closely and will be looking to play a key role in future developments.

Last, but certainly not least on the list of the Big-4, is the combine harvester.

This mammoth-sized machine has seen tremendous advancements over the past 35 years in terms of size, effectiveness, navigation, and control.

Combines of today are typically four times the size and capacity of the ones PAMI tested in the 1970s, and the amount of grain lost in the harvesting operation has been reduced to half of what it was in those days.

The operation of the machine has changed enormously as well. Combines are now often satellite-guided around the field, and can be adjusted on-the-go from the operator's seat. The new harvesters also employ a

number of very advanced processes in the age-old functions of reaping, threshing and winnowing.

PAMI has a central role in the development of combine harvesters worldwide. PAMI crews have been everywhere: across the prairies, throughout the U.S., Europe, South America, and Australia, testing and developing to help make these the universal machines that they must be.

PAMI has greatly advanced the science of combine testing and test equipment, and today is the key source in North America for testing equipment to the major combine manufacturers.

These machines will be integral to meeting the needs of a growing, hungry world in the future. With estimates of world population hovering around nine billion by 2050, feeding the world is going to require substantial innovations.

Machines we have today must grow bigger, faster and smarter to fill their role in feeding that future world.

At a PAMI visioning session with roughly 30 agricultural leaders from across Saskatchewan, dozens of suggestions were put forward regarding the innovation needs for the next decade.

*"PAMI is here to deliver practical results for the agricultural industry. Sessions like this are essential to ensure that our research is focused on producing the new technologies farmers want and need."*

*— David Gullacher, PAMI President and CEO*







*Producers and other industry stakeholders were asked to provide input into the future of the machinery industry. At the end of the day, they came up with a list of key suggestions, including smarter machines, smarter crops, and equipment that is not just bigger, but which works better.*

The suggestions were made under the topics of crop characteristics, rural population challenges, genetically modified crops, and labour and technology.

Top of the key suggestions was creating smarter machines; increasing robotics in farm machinery so that 24/7 harvesting is possible with fewer workers. However, participants did not endorse entirely driverless machinery.

Developing smarter crops was also suggested — researching new and improved varieties of high-margin crops, and using genetic engineering to develop crops that provide readily available nutrients or pesticides for another crop coming next in the rotation.

Participants also suggested sticking to the “smarter before bigger” principle. Farmers want machinery that is easier to operate and maintain while still being efficient, not necessarily bigger.

The idea that consumer is king was something participants asked researchers to keep in mind, to ensure producers understand and respond



nimble to what consumers want.

Ensuring that farmers are not overloaded by information by providing access to training and unbiased advice to deal with the increasing complexity of the industry was also suggested. Training for farmers should include providing high quality and standardized skills training for the emerging workforce of professional

farm machinery operators.

Last on the list was looking at sustainable farming, including lowering the environmental impact of farming and ensuring that crop varieties are viable in the long-term, even under changing climatic conditions.

These research goals will define a major part of the future work of PAMI.



## Agricultural Machinery Development



Agricultural machinery development continued to be a PAMI cornerstone in 2012-13. Over the past year, PAMI's work in equipment development has encompassed a wide array of design, testing, and development services. PAMI's dedicated team has worked on seeding equipment, grain handling implements, combine harvesters, combine headers, combine test equipment, hay and forage equipment, as well as grain conveyors. In some cases, PAMI has provided assistance all the way through the production engineering phase of product development. PAMI's design, fabrications, and testing services were heavily utilized for projects in these areas.

This year, PAMI increased its presence in the local economy, working with a number of Saskatchewan manufacturers.

Despite the number of projects focused on other machinery, combine harvester-related work once again claimed the attention of many of PAMI's technical staff in 2012-13. Major agricultural manufacturers often seek PAMI's expertise when tailoring their machinery for western Canadian crops and conditions.

With an eye towards strengthening technologies for building better combines, our personnel traveled North America and western Canada to spend time in the field with manufacturers, evaluating the performance of combines, combine residue spreaders, and headers.

PAMI is recognized as the world leader in the development of combine test equipment, and considerable time was spent developing such technologies in 2012-13. This test

equipment is critical for evaluating component improvements which will increase performance, efficiency, and reliability of the combines and headers of the future.

Looking to the future, PAMI's goal is to do more research in reducing combine loss.

The result of the work that we have done over the past year will result in machine improvements that will benefit farmers in the western Canadian market.

*"Excellent creativity and ingenuity, which is what we were looking for."*

*~ major agricultural machinery manufacturer representative*

*"PAMI's work allowed our company to be six to nine months ahead of where we would be in this project due to lack of our own resources to dedicate to the project. The project also resulted in more exposure to PAMI's experience and technical capabilities."*

*~ major agricultural machinery manufacturer representative*

## Farm Machinery Custom and Rental Rate Guide

Machinery rentals and custom work account for roughly \$450 million of annual farm operating costs in Saskatchewan and Manitoba. The Farm Machinery Custom and Rental Rate Guide, published by the provinces, is an important information source for those contracting or providing the service.

This guide is meant to help recommend a fair price for both parties when one farmer rents equipment from another, or hires the other to do a service. It also helps to set a value on machinery

or farming services provided to each operation when machinery or farm operations are being shared by farmers.

The guide was the product of a partnership between the Saskatchewan Ministry of Agriculture, Manitoba Agriculture, Food and Rural Initiatives, and PAMI.

In developing the new guide, PAMI helped revamp the way the calculations are done, and how repairs and maintenance costs are determined. In addition, an online calculator was developed so farmers can change input variables and

generate rates customized to their application.

This report informs producers about what they can expect for base, repair and maintenance costs over the life of a machine, and helps them make business decisions.

The publication was completed in the spring of 2012 and released by the two government bodies. Print and downloadable, interactive versions of this report are available at [www.agriculture.gov.sk.ca](http://www.agriculture.gov.sk.ca) and [www.gov.mb.ca/agriculture](http://www.gov.mb.ca/agriculture).

## Fibre Harvesting

PAMI is working with Manitoba Agriculture, Food and Rural Initiatives to develop a better way to harvest linen flax – a variety of flax which is typically taller and has a higher fibre content than other varieties. The goal of researchers involved in this project is to improve the quality of the flax fibre for its use as a fabric.

In order for this type of flax to be successfully processed into a fabric, longer stalks need to be preserved during harvest. Using traditional harvest methods, the stalks are cut and the fibre length is reduced. To keep the stalks intact, researchers brought in a machine from France to assist in the harvesting. These machines pull the straw out of the ground and lay it in rows, where it is picked up by another machine.

This research project is ongoing, and researchers are hoping to begin more plot trials this year.



*This linen flax harvester from France preserves longer stalks.*

## Grain drying and storage

Farmers all know that heat and moisture can combine to spoil grain. Aeration and Natural Air Drying (NAD) has been used for years as a means of cooling and drying grain for storage. Conventional wisdom was to turn the fans on and leave them on day and night until the grain reached a safe temperature and moisture condition.

PAMI has been studying natural grain drying since the 1980s. Our current research, focusing on exploring opportunities for optimizing natural grain drying, has been ongoing since 2007. In this project, researchers determined that farmers should run their fans during the day to get the most drying action out of the natural drying process, as hot air dries more effectively than cold air. Their data showed that

automated fan controllers can make the process simple and more economical.

PAMI's results contradicted the results of another study, which concluded fans needed only to be run at night to achieve the most efficient drying. The debate that has resulted has raised awareness that more information is needed.

Difference in strategy and changes in bin size have brought into question the recommendations pioneered in the 1980s. Evaluations of air flow, air distribution, and drying strategies for bins holding 10,000 bushels and more still need to be explored.

Funding for grain drying research was provided by the Saskatchewan Ministry of Agriculture.

## Solid Manure Land application

Is it better for the land if a solid manure is spread evenly over a field?

Not really.

That's the result PAMI researchers came up with after two years studying the impacts of uniformity of solid manure land application. Data was collected in collaboration with the University of Saskatchewan Soil Science researchers in 2011 and 2012. Using three plot configurations, they were able to examine soil where manure had been uniformly applied, soil with little application uniformity, and soil where there were heavy concentrations. They measured crop yield, runoff and nutrients in the soil and could not detect a significant difference in crop yield and nutrients among the treatments. Data analysis on runoff is still ongoing.

However, one decided result was that a concentrated distribution at high application rates – a high rate of manure with poor uniformity – was actually detrimental to crop yield on that field.

A previous study by the University of Saskatchewan and PAMI which looked at injecting solid manure had much the same result. There were no benefits to injecting solid manure



into the ground other than to decrease odour emissions, and the process actually increased greenhouse gas emissions. That's what prompted the look into the agronomic and environmental benefits, if any, of applying manure uniformly to a field. It turned out there were no significant benefits to justify an even application.

This lack of positive results shows that the current commonplace system for spreading solid manure on a field in a non-uniform manner is working as effectively as can be achieved.

There is no doubt of the benefits to spreading manure on a field, researchers noted. There

are nutrients in manure that farmers normally buy, and the manure improves the organic matter content of the soil. What this study has shown is that there is likely no better way to apply it to a field; as long as it's on the field, it's doing some good.

Funding for this area of study has been provided by the Saskatchewan Ministry of Agriculture.

## Manure research

As of November 2013, Manitoba will be under new legislation surrounding manure waste and phosphorus treatment. This is due in part to concerns that nutrient-loading in Lake Winnipeg is producing algae blooms. In June 2010, PAMI began evaluating treatments that would help producers with intensive livestock operations, especially in southeast Manitoba, comply with the legislation.

The basis of our work related to manure treatment is separating the liquid manure from the solid manure, in order to decrease the concentration of phosphorus in the liquid. The liquid manure can be applied to fields at a higher rate, without exceeding the limits of phosphorus per acre.

The two systems on which PAMI focused were a centrifuge and a rotary press. Staff installed and operat-

ed the systems at a commercial barn, where they evaluated its effectiveness, economics and overall suitability for placement on Manitoba farms. In addition, manure underwent an analysis before and after the treatment to study the effects on nutrient composition.

Last year, researchers at PAMI's Manitoba Operations continued their study of the centrifuge, evaluating it during winter conditions, as the technology had not been proven in Manitoba's climatic conditions. Researchers are also looking into quantifying the effect of a flocculant on phosphorus removal. Flocculants have been demonstrated to increase solids removal and phosphorus removal efficiency during mechanical separation. Researchers hope to demonstrate the limitations, challenges, and technical knowledge requirements associated with floccu-

lant use.

Researchers also evaluated a fine mesh filter system, which uses a different method of separating solid and liquid manure, and looked at the financial and technical feasibility of this system on the farm.

The end goal of these projects is to provide Manitoba farmers with verified performance and economic information on manure treatment technology to help them decide if it is a system that is economically feasible for their operation.

A final report on this area of study is forthcoming. The project was funded by the Manitoba Livestock Manure Management Initiative.

A private company was also provided assistance by PAMI researchers in developing their own manure separation system.



## Manure and greenhouse gases

PAMI began looking into the implications of applying liquid manure on fields in the late 1990s. Initially, the focus was on developing guidelines for a sustainable method. PAMI partnered with the University of Saskatchewan in trying to determine how much manure should be applied every year for maximum crop yield without it adversely affecting surface water runoff or leaching into the ground water.

Two long-term sites were set up for this project: one near Humboldt in 1996, and another near Melfort in 1999. PAMI staff have maintained the sites and applied the manure, while University of Saskatchewan researchers have focused on collecting data. PAMI has also acted as a liaison between the farmers and the university, coordinating the timing of the sampling within the crop year.

The research team, headed by Dr. Jeff Schoenau, looked at the rates, methods and sequence of applications of swine and cattle manure on the fields. This study allowed them to understand how manure application influences plant nutrients and crop growth. This understanding was used to improve manure guidelines for western Canada.

What the plots all showed was that manure application over a long term at the right rate is sustainable, and that it increases crop production, organic matter in the soil, and soil fertility. At the same time, it minimizes the environmental concern involving nutrient overloading in soil and losses of nutrient to water and air.

The site near Humboldt is now on its third year of monitoring after 12 years of manure application. The project in Humboldt is scheduled to end in the spring of 2014, after spring field work is done. The site in Melfort, meanwhile, has two more crop years until researchers will stop monitoring it.

Researchers have noted that since manure application ceased at the Humboldt site, nutrient levels are going down, but the phosphorus levels are not declining very quickly, especially on plots where cow manure was applied. What this shows is that once nutrients have been built up in the soil to a very high level through manure addition, they may only be slowly reduced over time by crop uptake and removal, depending on the nutrient.

Another study – this one on greenhouse gas emissions – began at the Humboldt site in 2009. Headed by Dr. Richard Farrell, the project was initiated to quantify and compare N<sub>2</sub>O emissions from agricultural plots receiving long-term applications of liquid swine manure or solid cattle manure to plots receiving equivalent rates of urea fertilizer. This study fol-



*A sample is removed from a greenhouse gas collector in the field.*

lowed the last two years of manure application at the site, and has continued in the years since manure application ceased.

What they found was the weather played a huge role in release of greenhouse gases or nitrous oxide. If there was an abundance of water in the spring thaw, a large amount of emissions was noted; if it rained following fertilizer applications, emissions also went up. However, as the seasons went on and crops used up the nitrogen in the soil, the emission events became smaller.

Their observations were that in normal, dry prairie conditions, emission factors for manure and urea plots were about the same, and normal for agricultural areas. When conditions were very wet, emission factors increased for both the urea and the manure plots to well above regional norms for emissions.

Taking all this data into account, they concluded that emission factors associated with the application of solid cattle manure are comparable to those associated with the application of equivalent rates of urea, but that the emissions from the application of liquid swine manure are generally higher than those of cattle manure or urea, but under normal semi-arid prairie conditions, are still within the range normally associated with prairie agriculture. The emissions from liquid swine manure were only significant in years that were particularly wet, and when the manure application rates were very high.

Regardless of source, the greatest potential for greenhouse gas emissions is associated with a high application rate.

The site will be monitored again this summer for this research project. Researchers are also planning to do some microbial work to further their knowledge in this area.

## Winter wheat

Demonstration trials of winter wheat during 2012 looked at varieties of winter wheat, fertility treatments, fungicides and herbicides, and stubble height. The focus of the trial, funded by Ducks Unlimited, was to showcase best management practices. The plot was used by the client as a stop during a field day last year.



# Bioenergy and Products

PAMI is a North American leader in evaluating alternative uses of agricultural products, byproducts and biomass as green energy resources and alternatives to petroleum and coal-based products.

In 2007, PAMI established the Applied Bioenergy Centre (ABC). Its mission is to play a key role in developing and using bioenergy sources from Canadian agricultural products. Through this centre, researchers are examining the most effective technologies for processing biological materials for effi-

cient energy extraction.

Over the past year, ABC researchers have travelled to Spain, Ontario, and local venues to attend conferences and webinars to share what they have learned in their research, and to gather information from other researchers and corporations looking to use bioenergy.

This cross-pollination of ideas gives PAMI increased capability more quickly than we could develop completely on our own.

## Solid State Anaerobic Digestion

Part of ABC's mandate is to conduct applied bioenergy research to benefit farmers, which is why many of the projects – including the solid state anaerobic digester (SSAD) – focus on transforming waste from agricultural processes into useful products.

PAMI's SSAD is all about converting agricultural residue and waste into energy. Digestion is a natural microbial conversion process; the digester provides the proper climate for breakdown, and collects the gases emitted, which are very energy-rich.

The process is as follows: the manure is loaded into the digester, where it is either inoculated with freshly digested material which contains microbes to start the digestion process, or saturated with leachate (the liquid produced by digestion) to achieve the same effect. The digester is sealed, then heated to 38°C and cooked for between 30 and 40 days. During that time, the leachate can be recirculated periodically.

Throughout the 30-40 day period, gas is being emitted into the gas collection system. Once the digestate is done "cooking", it is unloaded and the process starts all over again.

What's unique about the PAMI digester is that it processes solid biomass material. Most other digesters use liquid material. PAMI's goal is to determine the most practical and efficient way to digest solid biomass. This research puts our organization at the forefront of this technology.

The SSAD run by PAMI is using feedlot manure in its processes, but any solid organic waste could be used, and might include waste from slaughter facilities, feed waste, or even grass clippings. In 2013, researchers plan to introduce new feedstocks into the digester, including

cull potatoes and wet distiller grains (one of the byproducts of ethanol production) from an ethanol facility.

Researchers have been refining the digester design. Last year new reactors were commissioned. Originally, plastic bags were used as part of the containment system, but they proved to be difficult to seal and easily damaged.



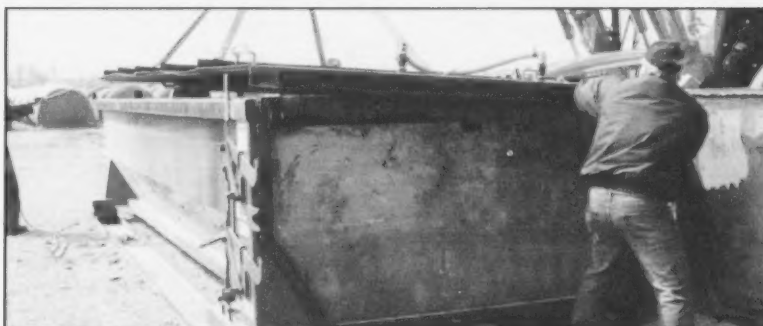
*The reactors are lined with lengths of piping for hot water heating.*



*Material is loaded into the reactor using a tractor.*



*The material is evenly distributed in the reactor.*



*The custom-designed lid is lifted into place and sealed.*

In the spring of 2012, large waste management tubs with custom-designed lids were modified to take the place of the bags. This enabled improved heating, sealing, and gas collection, and simplified loading and unloading.

At the same time, a bench-scale solid state digester was also designed, built and verified to assist in research. The functionality of the system mimics, as closely as possible, the larger digester, providing liquid recirculation, pressure maintenance gas collection and mesophilic temperature maintenance. The trials using this system are being conducted in collaboration with the University of Saskatchewan with the goal of optimizing a process which maximizes biogas production. The resulting treatment combination that proves most favourable will be applied to the larger system at the pilot facility.

The bench scale testing has allowed researchers to tweak their systems, and has provided valuable information for the full-scale testing. For instance, it was discovered that frequent recirculation of leachate hindered gas production and that the method of mixing substrates – either layering or intensive mixing – didn't make a difference in biogas production. The method of inoculation (leachate or digestate) also didn't significantly affect biogas production.

All of this information is new and will be extremely valuable for designing a large-scale solid state digester.

The plan is to eventually install equipment that will use the gas collected by PAMI's digester. That gas could heat a boiler that could heat the reactors themselves, and also run an engine to produce electricity, or be upgraded to natural gas and pumped into the provincial grid.

The solid material left after digestion is also useful. The digestate is stable and rich in nutrients, and can be applied to land as fertilizer. Researchers will also evaluate the benefits of composting the solid material and compare the nutrient value of raw, digested, and composted manure.

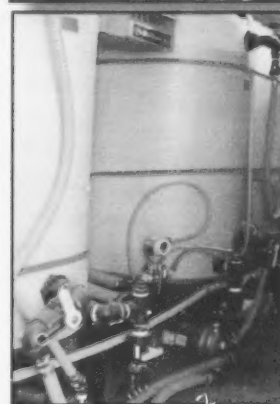
Researchers have done some rough calculations on the profit that could be made by selling composted digestate. They believe that by bagging and selling the material as a domestic fertilizer for a dollar a pound or more, assuming a profit margin of just 10 per cent, \$6.9 million could be made from the sale of half the manure produced by the nearby feedlot.



*The reactor is loaded into a shipping container for secondary heating and security.*



*Above: The gas collection and metering system is set up next door to the reactors and shipping containers.*



*At left: Leachate fills containers near the reactor, waiting to be used as inoculant for fresh material in the digester.*

## Biomass cubing and densification

Bulk is an obstacle facing the viability of solid biomass as an energy source. Through cubing, researchers at PAMI's Manitoba Operations are trying to increase the mass-to-volume ratio, in the hopes of subsequently reducing transportation costs from the field to the factory or furnace. Agricultural biomass can be an ideal source because of its low moisture content, potential for lower processing requirements, producer expertise in collection and storage, and carbon dioxide neutrality.

PAMI's Manitoba Operations worked on two projects in the cubing and densification of biomass last year. One of the two involved working with the Ontario Federation of Agriculture in looking at four types of biomass currently available in Ontario, completing work started the previous year.

PAMI used its own mobile densification system, designed and fabricated in-house, to study the opportunities for increased transportation distances by compact agricultural biomass.

They tested corn stover, soybean residue, miscanthus, and switchgrass to estimate the economics of compacting the crops to make them easier to transport. What they found is that certain materials worked far better than others – corn stover responded very well to the densification process, while soybean residue proved challenging, as did switchgrass and miscanthus.

Researchers are also looking at efficiencies in the densification process.

This work began in 2011 and continued over the past year.

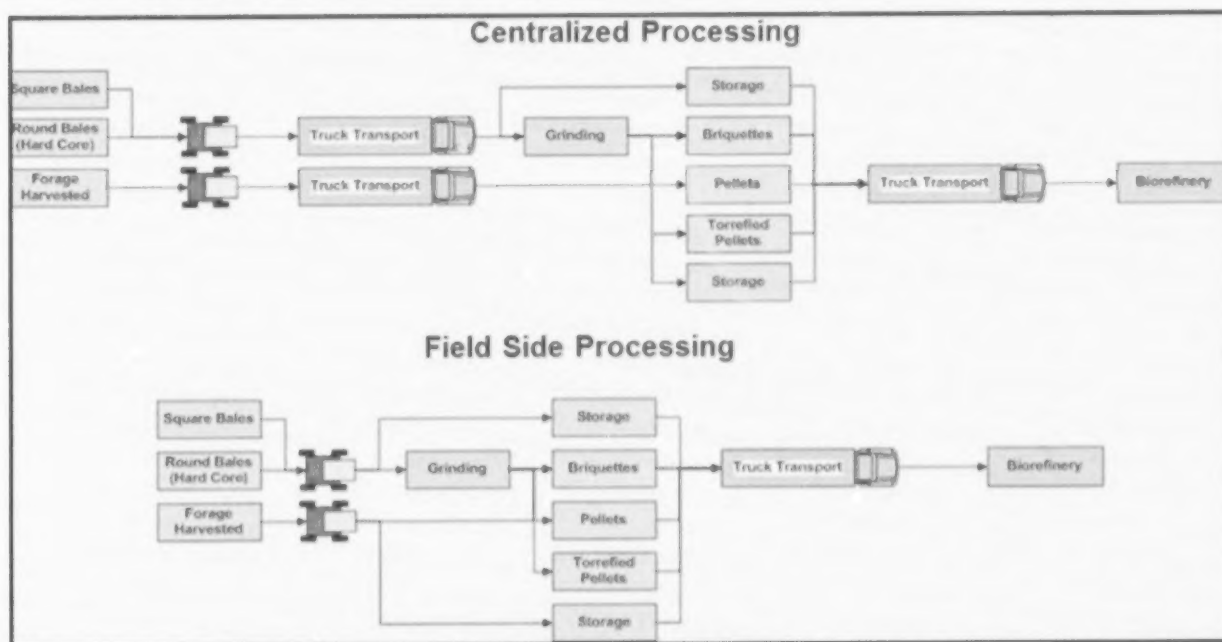
The second was a project through the ABC to evaluate cubing of agricultural residues such as wheat straw, corn stover, switchgrass, and miscanthus. The goal was to evaluate the cuber capacity, cube quality, energy consumption, and material losses during the densification process.

Researchers are hopeful this information will be used to improve the design of densification equipment to improve their efficiency at handling agricultural residues.





## Biomass logistics roadmap study



The Biomass Logistics Roadmap Study was completed in April 2012. The product of the study was an expert system that can be used to help determine if dedicated biomass crops and agricultural crop residues can serve as a viable, economically feasible feedstock for the bioenergy, biofuel, and bioproduct industries.

It offers producers and industry professionals information on agronomic, quality, densification, processing, and supply factors so they can make informed decisions related to biomass production and utilization.

The report examines several potential dedicated biomass crops – popular energy crops such as miscanthus and switchgrass, and grasses that are native to or grown for forage in Saskatchewan. The entire supply chain, from production to biorefinery delivery, was considered. The potential of agricultural crop residue (straw and chaff) use as a biomass feedstock was also examined.

What was concluded was that dedicated energy crops were much more costly to grow when compared to collecting agricultural residues, and that densifying the product to make a material easier to handle adds value, but is very costly. Researchers also found that a centralized processing plant for densification was more cost-effective than using field-side units, even when having to transport unprocessed biomass over a large distance, due to the inefficiencies of field-side operations.

Densification also does not significantly reduce material transportation costs when it is transported by truck, due to road weight restrictions. A truck carrying the denser material could only be about half-full, unless overweight permits are purchased to haul on Saskatchewan roads.

A spreadsheet model was developed from the research — a valuable tool for producers and industry — which can be used to estimate production, transportation, and processing costs to give the end user a general cost estimate for delivered biomass feedstock. Both report and spreadsheet model will help producers and industry professionals in Saskatchewan make decisions about whether or not agricultural-based biomass should be used as a feedstock for biofuels, bioenergy, and bioproducts.

This study, completed last year, was extremely well received. It has led to further projects for PAMI, including biomass plot trials of crops identified in the study, and FP Innovations on a contract project to assess the availability and costs of co-firing agricultural biomass with coal at the Shand Power Plant.



## Torrefaction and carbonization of agricultural residues

Torrefaction is a promising technology that may facilitate co-firing of biomass with coal in existing power plants, and improve the environmental and economic performance of biomass gasifiers in renewable electricity and liquid fuels applications.

The process of torrefaction involves heating in the absence of oxygen so that the thermochemical conversion creates char instead of ash; it's not burning, but roasting, and its only byproduct is char. The char behaves like coal, can be pelletized and is easy to crush. Barbecue briquettes are a product of torrefaction.

Agricultural residues, such as surplus wheat straw, are abundant in Saskatchewan, and may be co-fired with coal to produce electricity. However, the costs associated with delivering, storing, and utilizing unprocessed straw make co-combustion with agricultural residues uneconomical. Torrefaction of straw may help reduce the costs of storage and produce a higher quality fuel, which can be fired in existing burners.

Torrefaction may also improve the quality of syngas produced during biomass gasification.

PAMI is collaborating with the University of Saskatchewan's department of Chemical and Biological Engineering to develop a bench-scale prototype that uses novel "moving bed" torrefaction technology for use with both woody biomass and agricultural residues. This will help establish baseline operating parameters for torrefaction of agricul-



*Biochar produced from pyrolysis of cattails — another method of heating biomass in the absence of oxygen.*

tural residues, and the moving bed technology will eliminate any shortcomings in respect to material handling and flow that will help make scaling-up more effective.

Carbonization is a process similar to torrefaction, but there are a few key differences between them. Both processes involve the heating of biomass in the absence of oxygen, but torrefaction typically takes place at lower temperatures, while carbonization involves temperatures above 350 degrees Celsius.

PAMI's Manitoba Operations helped Manitoba Hydro operate a prototype carbonization system as part of a bioenergy optimization demonstration program, with the goal of encouraging agricultural and industrial customers of Manitoba Hydro to incorporate biomass-to-energy conversion systems.

PAMI agreed to operate and maintain the carbonizer at the Rock Lake Colony near Grosse Isle, Manitoba for a period of time, monitor and

analyze the operating characteristics of the anaerobic digester which will be operated near Winkler, and to inspect and service the gasification system near Hadashville.

PAMI's field capabilities — the hands-on approach staff like to take to projects — as well as our expertise in applying and implementing new technologies distinguishes us for this type of on site research work.

## Wind energy

Over the past few years, PAMI has assisted in wind energy research across Manitoba. PAMI's role has been the placement and operation of meteorological towers to measure the viability and economic benefit of erecting windmills for energy production at particular sites. We continue to provide monitoring and maintenance of these data collection towers, measuring wind speed and direction. There are currently four set up in Manitoba, including one in Churchill, which are continuously logging information.

# Western Beef Development Centre



[www.wbdc.sk.ca](http://www.wbdc.sk.ca)

The mission of PAMI's livestock research division, the Western Beef Development Centre (WBDC), speaks a huge commitment in a few words: "Collaboratively linking lab and land for the competitiveness and sustainability of the cow/calf industry in Saskatchewan."

The WBDC plays a unique and vital role in the development of the western Canadian cattle industry, communicating directly with the research community and the cattle industry. The WBDC has gained world-wide recognition for its relevancy, research capacity, and ability to communicate research results to end users like producers.

The Centre is based at Termuende Ranch, which has an expansive land base and facilities, as well as a 300-head cowherd. The ranch conducts research, development and demonstration projects in a partnership between the research community, industry and government.

The WBDC team of scientists, research associates, and ranch operations staff focus on applicable technologies to help cow-calf producers increase their competitiveness in today's marketplace. The WBDC offers a wide-ranging

set of skills and facilities that are also of use in third-party client research.

The Centre is operating at full capacity, and over the past year again tied its record of 20 projects. Most of those projects were publicly-funded, the results meant to benefit producers and the industry overall in areas like low cost winter feeding, forage legume rotation and bloat-safe legumes. Over the past year, the WBDC has also seen the number of private projects more than double. Projects for private clients undertaken in the past year have looked at animal health products, processed feed pellets, and novel feeds.

*"...the excellent work that the WBDC staff put into monitoring the study calves and recording data throughout the trial. I was very pleased with how smoothly the trial ran."*

DR. LEANNE VAN DE WEYER DVM MSC  
NOVARTIS ANIMAL HEALTH CANADA INC.

## Sainfoin

PAMI has been conducting a small-plot research trial with sainfoin planted among alfalfa for the past number of years. Sainfoin is a bloat-safe legume, containing condensed tannins that reduce gas formation in the rumen of cattle, decreasing the risk of the bloat which can occur when cattle graze 100 per cent alfalfa. By grazing just 15 per cent sainfoin along with 85 per cent alfalfa, the tannins from sainfoin reduce gas formation and prevent bloat in cattle.

However, sainfoin is not as persistent a plant as alfalfa – it is grazed selectively, is not as competitive, and tends not to last.

Sainfoin has already been tested in Lethbridge and Swift Current, both in the brown soil zone. The WBDC is providing the testing for this legume in the Parkland soil zone.

In 2011, the WBDC seeded five new experimental lines of sainfoin at Termuende Ranch, both as monocultures and mixtures with alfalfa. Establishment showed promise, and research continued into 2012 to determine if one of the va-



rieties would emerge with superior persistence, which would warrant its registration as a commercial variety with Agriculture and Agri-Food Canada.

The new variety has condensed tannins, which is good in ruminant diets. It also protects proteins in the rumen from microbial digestion, which means the protein in the diet is improved and the nitrogen is used

efficiently. As cows excrete between 80 and 90 per cent of the protein fed to them, increased protein absorption and increased nitrogen efficiency means a potential decrease of pollution from manure. Improving protein absorption means a producer could feed his cows less protein to get the same performance, which saves money.

The new sainfoin variety is also more persistent, which should help the beef industry improve its environmental footprint.

Funding support for this project was provided by the Beef Cattle Research Council (BCRC).



## Strategic Advisory Committee

### Cattle producers

Tim Oleksyn (Chair)  
Rick Toney (Vice Chair)  
Dennis Edwards  
Brent Griffin  
Murray McGillivray  
Duane Thompson  
one vacant position

### Researchers

Dr. Steve Hendrick  
Dr. John McKinnon

### Government representatives

Tracy Evans  
Ross MacDonald  
Grant Zalinko  
Melinda German



## Corn Grazing

The WBDC has a long history of looking into corn grazing of cattle. Over a decade ago, researchers looked into which corn varieties are best to feed to mature beef cows; then in 2011, they evaluated five new corn varieties. Last year, they embarked on a new three-year project, and conducted two separate studies.

The first study evaluates grazing corn for feeder cattle. It examines how well the calves grow when grazing corn so that when they arrive at the feedlot, they are ready for finishing diets. This could greatly impact feedlots, some of which feed the calves grain right through. While grain feeding maximizes their growth rate, it can be very costly. Because of the cost, many farmers are now backgrounding calves, but WBDC researchers believe this is the first time grazing corn has been looked at for this purpose, in Saskatchewan and in the wider world.

Early results from the study show promise but also provide some valuable warnings. Examples are that calves should be limited to three days of feed at a time, and that calves seem to have more trouble grazing the stalk of the corn plant than full-grown cattle.

The second experiment is studying how cows graze corn, and the effect the feed has on their rumen pH levels. What they have found is that in an area with three-days' worth of corn, the cows fed on the cobs first, then the leaves, husks and tassels the next day, leaving the stalk for the third day.

One concern that has been raised about corn grazing is the high level of starch found in corn. Too much starch, and pH levels of the rumen can start to drop, and eventually cows can experience rumen acidosis, a digestive disorder, which in severe cases can lead to shock and death.

By measuring pH levels in the rumen of fistulated<sup>1</sup> cows, researchers found that while pH levels did drop on the first day of fresh grazing, the cows recovered fairly quickly in the remaining days of grazing on the same section of field. Therefore, acidosis from corn may be a transitory effect when cows are limited to three-days' worth of grazing at a time. This is only a preliminary observation, but researchers believe it is promising.

This is the first time the WBDC has used this kind of intensive sampling technology in a grazing situation. Usually, in-



tensive studies of pH are only done in barns on campus, which makes this study quite unique.

There are 64 million acres of cropland in Saskatchewan, and a sizeable portion of it has the potential for growing corn, the WBDC believes. As developments in short season corn genetics continue, even the northern parts of the Parkland have potential.

The previous study undertaken by the WBDC on five new corn varieties looked at the economics of corn grazing cattle. The cost per head per day ranged across the five varieties from \$0.70 to \$1.42 hd/day and averaged \$0.94 hd/day.

Funding support for this project was provided by the Saskatchewan Agriculture Development Fund (ADF) and the Alberta Livestock and Meat Agency (ALMA).

<sup>1</sup> Cows with a stomach port for sampling.



## Individual Animal Feed Intake Measuring Equipment

New equipment at the WBDC is allowing them to track their cattle individually instead of as larger groups.

The equipment, manufactured by Grow Safe Systems of Alberta, uses the technology found in radio frequency identification (RFID) tags to identify animals at a feed trough, while a weighing system underneath records the amount of feed the animal consumes. Every day, computers at the site record how much the animal, identified by the tag, ate. Prior to the installation of this equipment, researchers recorded such information by group, not by individual animals.

This opens up a new area of research for the WBDC. For example, researchers are now studying residual feed intake, whereby some cows eat less than their penmates, but perform the same. This trait is promising as something to select genetically.

Using this new individual measuring equipment, researchers will look at the feed intake of heifers, and will try to predict, using DNA markers, which heifers are likely to eat less, but perform the same.

The WBDC installed this equipment in their pens last fall, and the first trial involving 90 heifers ran from October to January. This spring, the number of heifers involved in the study dropped to 60 and they were split into three groups – those with a high feed intake, those with a low feed intake, and those with an average feed intake as a control.

This equipment is likely to draw more projects to the WBDC because of the new capability it offers. While other research centres and universities have this equipment, the WBDC is the first in cow-calf research in Canada to try using it.

Funding support for this project was provided by the Saskatchewan Agriculture Development Fund.



## Short rotation forage legumes

Small plot trials investigating the effect that forage legumes can have on the soil began at sites in Swift Current, Saskatoon, Melfort, and Lanigan in 2010. Different rotations were tested, some beginning with alfalfa, and others with red clover, barley, and peas. The last two rotations of each will be wheat and canola – the former was planted in 2012, and the latter will be planted in 2013.

Conducted in partnership with PAMI's Saskatchewan Operations, who looked after seeding and harvesting operations, the goal of this project was to determine, by the response of the last two crops, how much residual nitrogen was left in the soil by the for-

age legumes.

Results from the first year showed that there was a very large amount of available nitrogen coming out of the alfalfa and red clover rotations, which can boost the availability of nitrogen for subsequent crops. This means that other crops, like wheat or canola, can perhaps be grown without the use of nitrogen or phosphorus fertilizer if they follow a crop of forage legumes.

Last year, a crop of wheat was grown on the land that previously held forages. Nitrogen fertilizer equivalent levels in the soil were extremely high in the Melfort plots. Lanigan also showed high levels, though not nearly as high as Melfort, and Saskatoon's

were lower than Lanigan's, but higher than Swift Current, the results of which were nil. Those plots in Swift Current were devastated by drought, showing that in a dry location, that will overwhelm all other considerations.

This year, the last of the four-year trial, researchers will be growing canola instead of wheat. The final results of the trial should be available by 2014. Researchers plan to look at the 2013 canola yield, as well as fertilizer use and soil drying, then do an economic analysis and an energy balance.

Funding support for this project was provided by the Saskatchewan Agriculture Development Fund.



## Straw Bunching

The WBDC, supported by PAMI, harvested an annual cereal crop in which the straw and chaff residue was bunched into piles for cattle to graze as part of a low-cost winter feeding research project. The project is evaluating canola meal as potential energy supplement for wintering beef cows on cereal crop residue.

Funding for this study was provided by the Agriculture Development Fund and the Saskatchewan Beef Industry Development Fund.



For more information,  
check out the WBDC website  
at [www.wbdc.sk.ca](http://www.wbdc.sk.ca).  
Click on the "Publications and  
Information" tab for reports  
and fact sheets

## Cost of Production

Cost of production surveys are conducted on an annual basis by WBDC's beef economist Kathy Larson. Larson works with producers, who gather and share information with her. She takes the collected data, analyzes it, and derives benchmarks. The conclusions reached are then released through published fact sheets.

WBDC's cost of production studies play an important role in informing governmental policy, providing industry direction, and encouraging producers to improve their efficiency. At the same time, WBDC is exploring processes and software to make cost of production data more readily captured and used directly by ranchers.

The 2011 study, which was released in the past fiscal year, revealed that the average cost per cow was \$625 (up \$10 from last year) with an average herd size of 305 cows (up 23 from last year). The average break-even price for weaned 2011-born calves was \$1.31/lb (550 lbs average weaning weight).

The study also showed that the difference between the bulk of the producers studied and the 25 per cent with the lowest total costs per cow was in the size of their herds, not in the cost of winter feeding, which has made the difference in previous years. Most producers are now on the same page when it comes to lowering winter feeding costs — the difference between the top 25 per cent and the rest of the group when it came to winter feeding days was just two days, as opposed to the 40 days' difference recorded in 2004.

What is now making the difference for cost per cow is larger herd size. Farmers are spreading out their yardage and overhead costs over more animals, which lowers the cost per cow. The top 25 per cent of producers studied have an average herd size of 508 animals, while the rest average 243, making their total cost per cow \$491, as opposed to the \$664 of the rest of the group. That brings their break-even number for a 550 lb calf to \$0.98/lb instead of the \$1.33/lb needed by the rest of the producers.

A new venture of the WBDC is partnering with Alberta Agriculture and Rural Development to enhance that province's cost of production tool for producers. This way, producers can do their own cost of production estimates, and therefore know what their specific break-even point is.

*"I'm a big fan of Kathy Larson and her Cost of Production study. I quote her results often."*

KEVIN HURSH, AGRICULTURAL CONSULTANT, JOURNALIST AND FARMER

## RFID tags

Radio frequency identification (RFID) tags were mandated by the Canadian Food Inspection Agency in 2002 to help track the movement of cattle from birth until slaughter. In 2010, federal and provincial governments made animal identification by RFID tags mandatory for movement and sale of beef cattle. Through the ability to pinpoint the source and path of animals, the beef industry will be enhanced and protected with the knowledge of which animals are at risk.

However, there is some frustration with the system over some reports of poor retention of tags.

PAMI is conducting research on RFID tags on two fronts. Saskatchewan Operations has been doing lab based studies of RFID tag retention, including ways to improve it. The Western Beef Development Centre (WBDC) is examining how farm management practices impact the retention of RFID tags.

Researchers at PAMI's Saskatchewan Operations have been taking an engineering approach when examining the design of the RFID tags. They created a simulated ear, then looked at the insertion force for each type of tag and break-apart strengths, and ran them through a series of tests, varying temperatures and ear thickness.

They have found that, overall, when the correct brand of tool is used to apply the tags, they meet the strength requirements set out by the Canadian Cattle Identification Agency (CCIA)

One of the key differences PAMI researchers have identified in their study is the impact of cold temperatures on tag retention. They have found that cold temperatures make the tags more difficult to insert, and tags break apart more easily when inserted in the cold. Producers are therefore advised to add that piece of information to their list of best practices for tag application.

At this point, researchers are getting indications of which types of tags are stronger, which tags are easiest to insert, and which are the least variable overall in terms of performance.

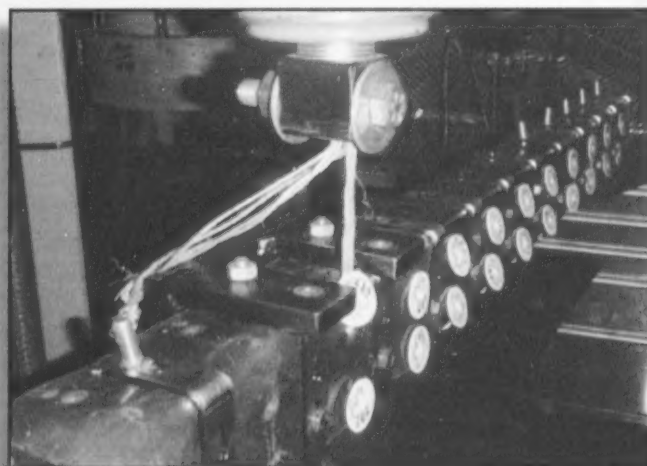
Next, PAMI's Saskatchewan Operations researchers will be focusing their attention on the force required to pull the tag through the ear.

The WBDC has been working with the CCIA and the Agri-Environment Services Branch (AESB) of Agriculture and Agri-Food Canada (AAFC) as part of a multi-provincial project. Using their own herd and others in Saskatchewan, WBDC staff installed

tags from seven different manufacturers on 140 cows in total, according to

each manufacturer's recommendations, and monitored tag retention. In 2012-13, the second year of the project, they followed the herds and collected data on how well the tags were staying in.

The data for the multi-year farm and ranch trials is unavailable at this time.



*Researchers test the insertion force and strength of the RFID tags on a simulated ear.*

# Industry

The testing of industrial equipment at PAMI was a natural evolution of our deep and diverse engineering and design knowledge, and our experience with agricultural equipment. Looking to expand our horizons, we realized that our experience and approach to design and testing was naturally transferable to – and in demand by – other equipment manufacturing sectors like the vehicle and transportation industry, defence and security, as well as the mining and forestry industries.

PAMI's strategy, which focuses on deriving the best possible design through physical testing, ensures that a design is arrived at quickly and effectively, but through a careful process at the same time.

PAMI has the physical test equipment, protocols and know-how to accurately predict field performance to reduce design, production, downtime and warranty costs, and can collaborate effectively in the design and development process.

This year, PAMI conducted more than 100 projects for clients in the industrial sector, in our region and beyond. The project outcomes are confidential to the clients who funded the work, but they aim toward product improvement, validation and verification and will help create an estimated \$8.6 million in economic impact in the region, as well as help to fund PAMI's operations from other sectors and geographic regions.

## Vehicle Testing

There aren't many places that can do what PAMI can when it comes to testing vehicles of all shapes and sizes. Requirements for performance standards testing are increasing for all types of products and equipment, and we have leveraged our ISO 17025 accreditation to provide internationally-supported documentation of client equipment test results. Our experienced staff, with their expertise in standards testing (to known standards or those self-imposed by the client), along with state-of-the-art, unique test facilities, have earned PAMI the distinction of a National Laboratory. All tests are overseen by professional engineers, who produce test reports recognized by official standards-testing bodies and government regulatory bodies.

PAMI can test equipment and machinery to comply with standards produced by:

- the Society of Automotive Engineers (SAE)
- the American Society of Agricultural and Biological Engineers (ASABE)
- the American Society of Mechanical Engineers (ASME)
- Canadian Standards Association (CSA)
- Canadian General Standards Board (CGSB)
- Canadian Motor Vehicle Safety Standards (CMVSS)
- Federal Motor Vehicle Safety Standards (FMVSS)
- International Standards Organization (ISO)
- Occupational Health and Safety Act (OHAS) [U.S. and Canada]
- Organization for Economic Cooperation and Development (OECD)



*A siren test is conducted on an ambulance at the PAMI facility in Saskatchewan.*

PAMI's scope of accreditation allows us to conduct testing on operator protection systems for agriculture, earth-moving, industrial and forestry machines, and stationary equipment such as winches. Our scope also includes testing on transportation, agricultural and construction vehicles and components, heavy duty and commercial trucks, buses and trailers, and street sweepers.

PAMI can help clients meet National Safety Mark (NSM) Certification, requirements which are designed to ensure the continued safe operation of the increasingly diverse fleet of vehicles on the road today. We have been building an in-depth understanding of NSM regulations and their implications for manufacturers.



PAMI's experienced engineers can enhance their clients' own abilities to certify their completed vehicles, or can conduct the certifications on behalf of their clients. Our staff can help with any questions regarding NSM, and assist with ensuring products are in compliance with NSM requirements, and enhancing customer satisfaction with transportation products.

Within the past year, PAMI has assisted several companies with cold-start and cold-operation of their Diesel Emissions Fluid (DEF) injection systems to meet EPA Tier 4 requirements, making use of PAMI's large environmental chamber at their Saskatchewan facility.

PAMI is ideally situated to assist companies with cold weather testing. PAMI's locations, facilities and expertise make the organization attractive to manufacturers who request these types of tests. PAMI's engineers can also assist manufacturers in verifying the strength of their designs, such as tie-down brackets on cargo containers.

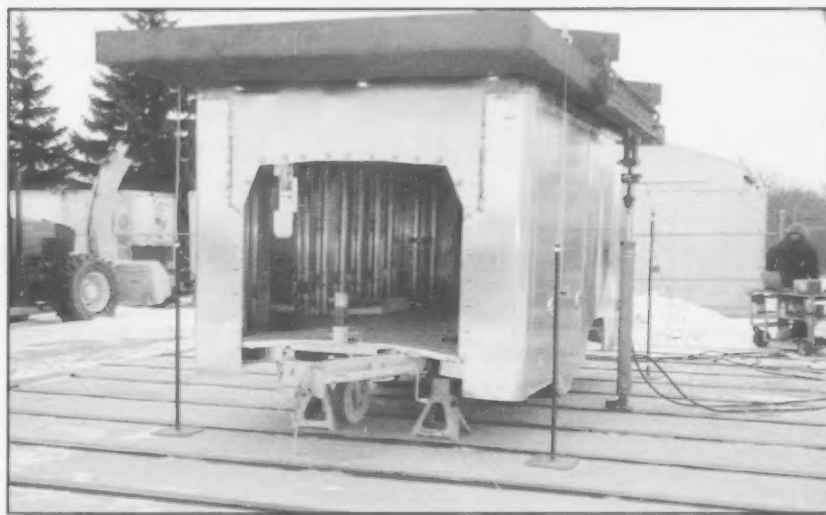
One type of vehicle PAMI has extensive experience with is the ambulance. PAMI engineers have conducted a wide array of tests on the safety systems of ambulances, primarily for private clients. We can do testing to meet the requirements of any jurisdiction, as well as compliance testing.

PAMI's scope of accreditation lists 19 in-house test procedures for ambulances, and these test procedures address all of the requirements of the current versions of eight provincial, Canadian, and U.S. regulations for ambulances.

Ambulances are put through their paces at PAMI facilities. Engineers have the ability to test the body structure static load of the vehicles, as well as body door retention, pressure vessel retention, patient litter retention systems, 12-volt electrical systems, patient compartment sound levels and carbon monoxide levels, equipment temperature and interior climate controls, weight distribution, and the vehicle's centre of gravity, just to name a few. In total, PAMI can run over 40 tests on ambulance systems, right down to the siren, to ensure they comply with safety regulations.

*"We will continue to return to PAMI for our testing needs due to our long-standing business relationship and due to the high quality of the testing and documentation that PAMI provides."*

MARK INGRAM, CRESTLINE COACH



*Researchers perform a structure test on an ambulance frame.*

Our ambulance certification services are a critical function for our clients. PAMI's certificates are often required before our clients' customers will accept delivery.

## Small and Medium Enterprises (SME) Innovation Initiative

Through funding by the National Research Council Industrial Research Assistance Program, PAMI is contributing to an initiative to increase competitiveness and innovation capability of SME manufacturing companies. The purpose of the initiative is to build SME awareness of the technological opportunities to accelerate product commercialization, reduce risk, increase profitability, attract investment, contribute

to the economy through wealth generation and job creation, and their market readiness.

Over the past year, PAMI has assisted 42 SMEs that can be divided into two groups — small businesses in need of guidance to make their ideas into a product they can commercialize, and larger companies who need help designing and testing a product for specific markets. PAMI staff, who have a

unique ability to share their technical experience with the SMEs, have not only assisted the companies in building awareness, knowledge and processes within their own system, but also in preparing their product for the market. That market readiness has involved design and testing, product development, market analysis, benchmarking, competitive business intelligence, and process development.



## Defence and Security

PAMI continues to support Canadian military and RCMP personnel by testing equipment they are looking to purchase, solving mechanical problems, and reducing maintenance costs. PAMI also does ballistic testing and material modeling for these agencies.

This past year, PAMI has supported the Royal Canadian Air Force by providing structures of prototype CH146 helicopter simulators. The simulators will be used for training helicopter pilots and crew in Canada.



*"PAMI has delivered high-quality products in very short timelines at good cost in support of the Canadian Advanced Synthetic Environment (CASE) project. Their customer-oriented support approach is second to none, and our relation with PAMI has been extremely successful over the past three-plus years. PAMI has simply been outstanding in helping us achieve our project's objectives."*

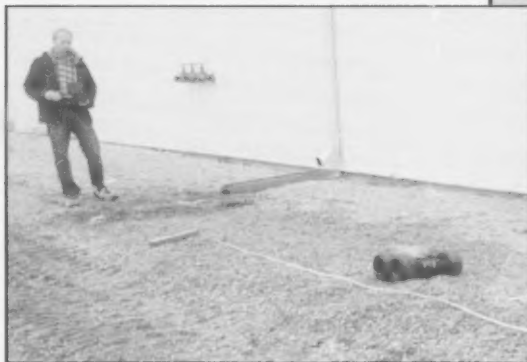
DND TECHNICAL AUTHORITY

In 2012, PAMI engineers performed head-to-head evaluations of competing miniature Remote Operated Vehicles (ROV) that may be purchased by the Department of National Defence.

The ROVs PAMI tested are very small vehicles that can carry disruptors and cameras. ROVs of this nature are used by Canadian soldiers to safely enter areas that may contain dangerous objects such as unexploded ordnance or suspicious packages that may contain Improvised Explosive Devices (IEDs).

ROVs are used by the Canadian Armed Forces and police forces across Canada.

As an independent provincial government agency, PAMI provides unbiased testing and data collection to all clients. PAMI's expertise in testing farm machinery and vehicles in various environments, as well as mechanical and electrical engineering design, is directly applicable to testing any robotic system. Robotic technology is a form of mechanization that could be applied to precision farming and the development of future autonomous agricultural systems.



## ROPS

PAMI has long been involved in both the design and testing of rollover protective structures (ROPS) for agricultural and industrial products. Our facilities are among the most active independent ROPS facilities in North America, and maintain membership on the Canadian Standards Association ROPS committee.

According to "Agricultural Fatalities in Canada 1990-2008," a report published by Canadian Agricultural Injury Reporting, rollovers were the number one cause of death in that time period, with 392 fatalities. That accounts for 20 per cent of all agricultural fatalities in Canada in that period. Statistics from the United States also show that tractor rollovers are the single deadliest type of injury incident on farms in that country. Figures from 2011 from the National Institute of Occupational Safety and Health (NIOSH) suggest there are approximately 250 tractor rollover fatalities per year. NIOSH also estimates that there are approximately 4.7 million tractors in use on U.S. farms, and half are without rollover protection for the operator.

PAMI has built on its reputation as a leading innovator in finding solutions to make ROPS for older tractors more affordable. This past year, PAMI engineers looked into alternatives to the ROPS commercially available for older tractors, investigating engineered solutions that could possibly be locally fabricated. ROPS are expensive and hard to get for older tractors, which prevents some people from installing them on their equipment. Part of this study was to look at locally fabricated options to see if they would meet safety standards from an engineering perspective. A locally fabricated solution has yet to be found.

PAMI staff engage in regular ROPS projects for industry, particularly unique machines in the oil and gas, mining and forestry industries, including earth moving machinery, tractors for agriculture and forestry, and self-propelled machinery for forestry.

Operator safety has and will always be very important. PAMI's research and testing of ROPS will continue to save lives and improve farm and industrial safety.

## CSA Technical Committee on Agricultural Machinery

Jim Wassermann, Vice President of PAMI's Saskatchewan Operations, is the Vice Chair of the Canadian Standards Association (CSA) Technical Committee on Agricultural Machinery. The committee, which consists of manufacturers, researchers, regulators, and producers, maintains approximately 15 CSA standards, while also either adopting or endorsing about 30 applicable international standards that allow designers and engineers to develop new machines that meet national standards and international guidelines.

Today's emerging issues, as identified by the CSA Technical Committee, include:

- Lighting and marking of agricultural equipment on highways.
- Imported grey-market<sup>2</sup> machines that do not meet our safety standards.
- Implement hitching and braking systems
- ATV-type farm utility vehicles.

PAMI's research program, which is intended to solve machinery-related issues for farmers, also includes services related to safety. In 2004, PAMI's safety services were expanded after conducting a project for the Canadian Agricultural Safety Association (CASA). That project determined a gap existed in engineering safety support for older farm machinery.

Since then, PAMI has partnered with CASA and provincial farm-safety associations like British Columbia's Farm and Ranch Safety and Health Association (FARSHA) to conduct several projects to improve the safety of older farm machinery.

A number of publications resulting from those projects are available for download on the PAMI website at [www.pami.ca](http://www.pami.ca).

<sup>2</sup> Grey market goods refer to legal goods sold outside normal distribution channels by companies which may have no relationship with the producer of the goods. This occurs frequently when the price of an item is significantly higher in one country than another.



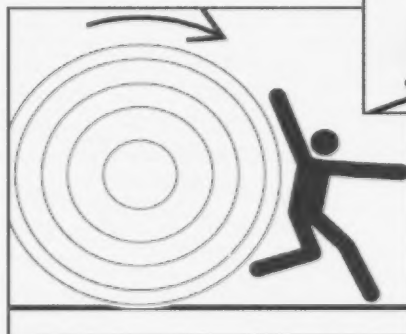
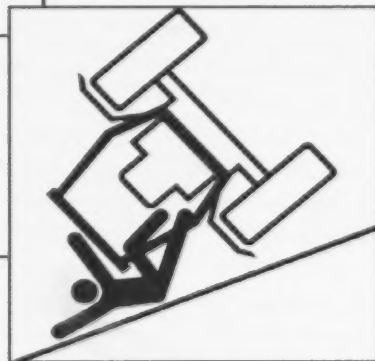
Rotating shaft hazard

Rotating auger hazard



Falling from machine

Machine rollover with ROPS (Rollover Protection System)



Crushing hazard — runaway round bale

# WESTEST

## Board of directors

**Jerry Engel** (chair), Agricultural Manufacturers of Canada (AMC)  
**Carol Vibert** (vice chair), AMC  
**James Umlah**, AMC  
**Damir Gospic**, AMC

**Ray Malinowski**, AMC  
**Rhonda Orr**, Manitoba Hydro  
**Pamela Schwann**, Sask. Mining Assoc.  
**Don Watt**, CNH Global  
**Kevin L. Ehrecke**, John Deere

WESTEST is an industrial testing and engineering facility with over two decades of proven, industry-respected service delivering advanced product engineering and development. Its offerings are integrated with a wide array of physical testing capabilities to equipment and vehicle manufacturers across North America. WESTEST evaluates components, full vehicles, and machines for a broad range of equipment and manufacturing industries.

As all work for clients is confidential, the projects cannot be described in detail. However, WESTEST's ability to physically evaluate designs under simulated conditions that accelerate normal operation allows clients to quickly and effectively develop durable products with little uncertainty regarding their performance in service. This provides them with a substantial competitive advantage through rapid roll-out of new products.

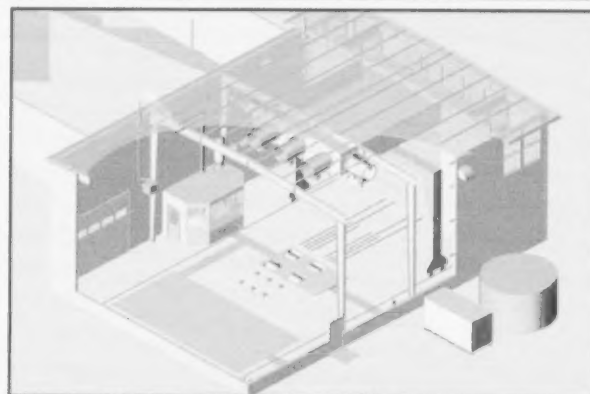
The Vehicle Performance Centre consists of a dedicated temperature controlled building large enough to accommodate a 45-foot vehicle and contains a chassis dynamometer, an engine test stand, and 100,000 cubic ft./min. air exchange. Full-load testing is done in the centre. This type of facility is not available elsewhere in western Canada. These services provide WESTEST clients with additional tools to accelerate their product development cycle and improve their competitive advantage.

WESTEST facilities also include a hydraulic power unit, MTS Flextest System, towed dyno, and MAST table. WESTEST is capable of force and vibration simulation testing to provide a dynamic durability test service. Other services regularly performed at WESTEST include: Roll Over Protection Structures (ROPS), Fall Object Protection Structures (FOPS), gearbox testing, tilt testing, noise and vibration testing, package testing, strain gaging, military projects extreme testing and evaluation, large engine cold starting tests, and container testing.

WESTEST staff are trained in the latest 3D design and modeling software and can also provide Finite Element Analysis. Staff are experienced in standards testing, whether to a known standard or the clients self-imposed standard, and can test equipment and machinery to comply with most known standards produced.

*"Great folks to deal with. It was our first testing with Westest. Well done!"*

*RANDY SIMONNEAU, ENVIROTANKERS*



*WESTEST's Vehicle Performance Centre (above) can accommodate testing of doubledecker buses, snowblowers, and more.*





# Outreach

## Website

A new PAMI website was launched in May 2012. The site at [www.pami.ca](http://www.pami.ca) includes an online library of our reports, both past and newly released. The library includes an index of the PAMI equipment reports, and a downloadable version of those reports, as well as resources on best management practices, safety publications, producer information, corporate information, and links to other sites.

The website also includes information on what PAMI does in different fields, from crops to livestock, bioenergy to industry, as well as a list of PAMI's capabilities for clients.

Last year's annual report, as well as PAMI news releases, can be viewed on the website as well.

## Combine Clinic

A few years ago, the rebirth of the Combine Clinic to large crowds indicated there was a pent-up demand for practical farm machinery information among producers. In 2012, PAMI staff presented a clinic at the Conservation Learning Centre in Prince Albert. The 80-plus producers at the event received information about natural grain drying, combine adjustment and loss measurement.

## Conferences and presentations

PAMI staff have presented their findings at various industry and government events all over Canada in the past year.

PAMI's researchers have presented the results of their manure processing technology evaluation projects at industry seminars, as well as to the Manitoba Manure Management Advisory Committee. They also spoke about their small wind turbine installation at the Manitoba Agriculture, Food and Rural Initiatives (MAFRI) Diversification Centre Grand Opening, and gave a presentation on PAMI biomass initiatives at the MAFRI Bioenergy and Bioproducts team meeting.

Applied Bioenergy Centre (ABC) researchers have attended conferences and webinars in Spain, Ontario, and local venues to share what they have learned in their research, and to gather information from other researchers and corporations looking to use bioenergy. In the next year, they will travel to Europe and other parts of North America, and bring Canadian researchers to the ABC through the Canadian Society of Bioengineering conference, taking place in Saskatoon in July of 2013.

## WBDC field day

The WBDC reaches out to producers to help improve the competitiveness of their operations. Staff create fact sheets for producers and scientific papers, organize events like the WBDC yearly summer field day held every June, and perform speaking engagements. The WBDC publishes a quarterly electronic newsletter and posts YouTube videos summarizing research results.

Check out the WBDC website for more information at [www.wbdc.sk.ca](http://www.wbdc.sk.ca) and click on the "Publications and Information" tab for reports and fact sheets.





## Our Projects

PAMI had a busy year in 2012-13, undertaking nearly 190 projects. This work occurred in the areas of Agriculture, Defence and Security, Energy, Industry, and Transportation.

Although a number of the projects are confidential, the following list shows some of the general topics addressed.

Those projects included:

- SME Marketing Initiative
- Manure Application and GHG Study
- Improving Retention of RFID Tags
- Continuation of Long-Term Manure and Green House Gases Study at Dixon and Melfort
- Impacts of the Uniformity of Solid Manure Land Application
- Short Rotation Forage Legumes
- Comparison of Herbicide on Absinthe
- Evaluation of Canola Meal (straw bunching)
- Agricultural Biomass Densification
- Design of Bench Scale Torrefaction Equipment
- Expanded Solid State Digester Trials
- Large Scale Torrefaction (Carbonizer) Demonstration
- Saskatchewan Biomass Logistics Road Map
- Optimization of Solid State Digestion Operating Parameters
- Winter Wheat Demonstration
- Aeration and Natural Grain Drying
- Corn Crazing
- Sainfoin production
- Grow Safe Equipment Installation
- Biomass Workshop
- Farm Machinery Rental and Custom Rate Guide
- Fibre Flax Production Harvesting
- Cattail Biocarbon Project – Commercial Cattail Harvesting Research.
- Manure Separation Research
- Evaluation of Salsnes Fine Mesh Filter System for Liquid Pig Manure
- Biomass Cubing Demonstration Using Native Willow From Swan River



## Our People

PAMI's strength is in its people.

This multi-faceted research and development organization has been able to tackle a wide range of projects in a variety of fields. Our people have a unique mix of capabilities, areas of expertise and knowledge among them, which gives PAMI both flexibility and range when it comes to taking on new projects and bringing in new clients.

Due to the close ties many employees maintain to the agricultural industry, there is intimate knowledge among the staff in terms of agricultural equipment for any stage of the growing cycle, from seeding to spraying to harvesting and processing.

Staff capabilities have also allowed PAMI to extend their scope of work beyond equipment to crops, fertilizers, and bioenergy research. PAMI's teams of engineers and agrologists work together to research new crop varieties, advance forage technologies, and find ways to turn agricultural waste into energy for all.

The knowledge gained by staff in the agricultural sector has extended PAMI's scope to include the testing and design

of industrial mechanical equipment and vehicles. This dual focus has earned the organization a unique place in the business sector.

The strategy used by PAMI staff to design, build and test equipment provides practical knowledge to clients about how their product or piece of equipment will function in the real world. This allows PAMI to go far beyond engineering theory for their clients, and leads to cost-effective and durable solutions and designs that save our clients money and time.

The confidentiality maintained by PAMI's people also makes it a desirable place for public and private clients to make product improvements or design and test new products to create a competitive advantage in the marketplace.

PAMI and its staff work together to give back to the community. This spring, staff decided to gather donations among themselves for the local hospital foundation's most recent equipment campaign. The donations were matched by PAMI, and that amount was then matched by PotashCorp Lanigan.



# Financial Highlights

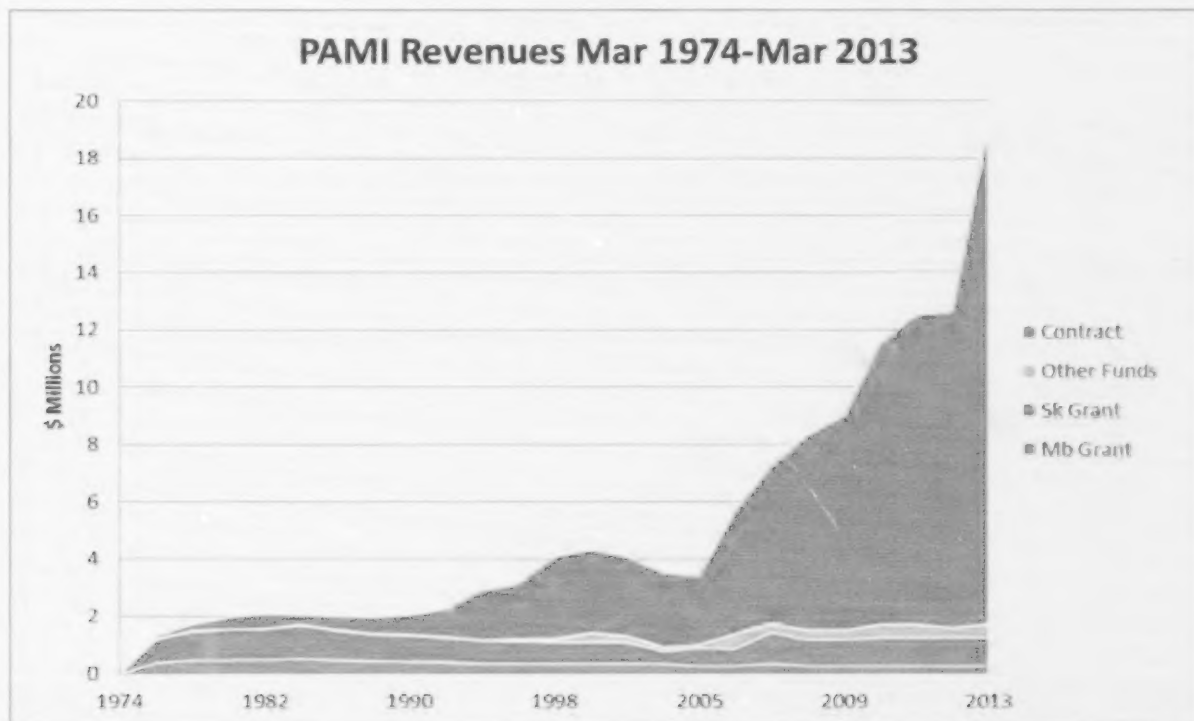
The year ended March 31, 2013 was a very successful year for PAMI from a financial perspective. Total revenues from operations were our highest ever at \$18,851,587, a \$6,490,475 (52%) increase compared to \$12,364,112 from the previous year. These revenues are offset by an increase of \$3,874,121 in fee-for-service direct costs.

For next year, our confirmed fee-for-service contracts are already at \$8,924,080, with another \$562,557 in expected work from proposals outstanding.

Operating expenses for the year ended March 31, 2013 totaled \$17,903,837, an increase of \$5,484,531 or 44% compared to \$12,419,306 in 2012. The cost increases were comprised primarily of costs associated with our increased revenue such as fee-for-service direct costs and personnel costs.

Surplus before capital grants for the year was \$947,750 compared to a deficit of \$55,194 for the year ended March 31, 2012. The amortization charge on plant, equipment, and herd for the year was \$444,033, compared to \$431,384 in 2012. PAMI received \$11,772 in government funding for capital in 2013.

Capital expenses for the 2012 year were \$517,678, compared to \$650,183 in 2012. PAMI continued to focus its capital expenditures on growth initiatives, including expansion and upgrades to facilities, and revenue producing initiatives.





# Financial Statements

## Management Report

To the Members of the Legislative Assembly of Saskatchewan

Year Ended March 31, 2013

The accompanying financial statements are the responsibility of the management of the Prairie Agricultural Machinery Institute. They have been prepared in accordance with Canadian public sector accounting standards, using management's best estimates and judgments, where appropriate.

Management is responsible for the reliability and integrity of the financial statements, the notes to the financial statements, and other financial information contained in this report. Management is also responsible for maintaining a system of internal controls, policies and procedures designed to provide reasonable assurance that assets are safeguarded and the accounting systems provide accurate and reliable financial information.

The Board of Directors is responsible for ensuring that management's responsibilities are properly discharged, to review and approve the financial statements. The Provincial Auditor of Saskatchewan has audited PAMI's financial statements in accordance with Canadian generally accepted auditing standards and her report follows.



David Gullacher  
President and CEO



Joanne Forer  
V.P. Finance and Administration

PROVINCIAL AUDITOR  
of Saskatchewan

INDEPENDENT AUDITOR'S REPORT

To: The Members of the Legislative Assembly of Saskatchewan

I have audited the accompanying financial statements of Prairie Agricultural Machinery Institute, which comprise the statement of financial position as at March 31, 2013, and the statement of operations and accumulated surplus, statement of remeasurement gains and losses, statement of changes in net financial assets and statement of cash flows for the year then ended, and a summary of significant accounting policies and other explanatory information.

*Management's Responsibility for the Financial Statements*

Management is responsible for the preparation and fair presentation of these financial statements in accordance with Canadian public sector accounting standards for Treasury Board's approval, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

*Auditor's Responsibility*

My responsibility is to express an opinion on these financial statements based on my audit. I conducted my audit in accordance with Canadian generally accepted auditing standards. Those standards require that I comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

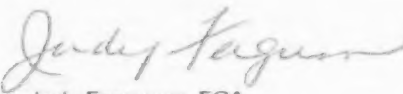
An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my audit opinion.

*Opinion*

In my opinion, the financial statements present fairly, in all material respects, the financial position of Prairie Agricultural Machinery Institute as at March 31, 2013, and the results of its operations, its remeasurement gains and losses, changes in its net financial assets, and its cash flows for the year then ended in accordance with Canadian public sector accounting standards.

Regina, Saskatchewan  
July 10, 2013, except as to Note 15 which is  
as of April 11, 2014

  
Judy Ferguson, FCA  
Acting Provincial Auditor

# Statement 1

## Statement of Financial Position

### As at March 31

	2013	2012 (Restated) (Note 13 and 15)
<b>Financial Assets</b>		
Cash	\$ 435,465	\$ 23,065
Due from General Revenue Fund (Note 3)	2,759,883	2,580,367
Accounts receivable (Note 4)	4,045,257	3,285,332
	<u>7,240,605</u>	<u>5,888,714</u>
<b>Liabilities</b>		
Accounts payable and accrued liabilities (Note 5)	1,806,016	1,100,289
Unearned revenue	614,716	672,317
	<u>2,420,732</u>	<u>1,772,606</u>
<b>Net Financial Assets (Statement 4)</b>	<b>4,819,873</b>	<b>4,116,108</b>
<b>Non-Financial Assets</b>		
Tangible capital assets (Schedule 1)	4,503,301	4,371,411
Prepaid expenses	242,192	240,585
Breeding herd (Note 6)	264,427	250,373
Inventory held for consumption (Note 7)	325,177	216,276
	<u>5,335,097</u>	<u>5,078,645</u>
<b>Accumulated Surplus (Note 8)</b>		
Accumulated operating surplus (Statement 2)	10,153,852	9,194,330
Accumulated remeasurement gains (losses) (Statement 3)	1,118	423
	<u>10,154,970</u>	<u>9,194,753</u>
	<u><b>\$ 10,154,970</b></u>	<u><b>\$ 9,194,753</b></u>

Contractual obligations and contingencies (Note 14)

(See accompanying notes to the financial statements.)

## Statement 2

### Statement of Operations and Accumulated Surplus For year ended March 31

	Budget (Note 12)	2013	2012 (Restated) (Note 13 and 15)
Revenue			
Provincial Transfers:			
Government of Saskatchewan			
Ministry of Agriculture			
- operating	\$ 995,000	\$ 995,000	\$ 995,000
Government of Manitoba			
Department of Agriculture, Food and			
Rural Initiatives			
- operating	260,000	259,682	259,682
	1,255,000	1,254,682	1,254,682
Fee for service	13,696,818	17,055,116	10,706,385
Interest income	6,400	39,262	37,062
Other income	281,100	502,527	365,983
Total revenues	15,239,318	18,851,587	12,364,112
Expenses			
Saskatchewan	10,372,403	13,764,289	8,702,689
Manitoba	2,429,977	2,373,360	1,846,912
Western Beef Development Centre	1,449,836	1,666,460	1,449,991
Corporate Services	292,887	99,728	419,714
Total expenses	14,544,903	17,903,837	12,419,306
Operating surplus (deficit) before capital grants	694,415	947,750	(55,194)
Capital grants from Department of Agriculture, Food and			
Rural Initiatives	-	11,772	-
Operating surplus (deficit) for the year (Schedule 2)	\$ 694,415	959,522	( 55,194 )
Accumulated operating surplus, beginning of year		9,194,330	9,249,524
Accumulated operating surplus, end of year (Statement 1)		\$ 10,153,852	\$ 9,194,330

(See accompanying notes to financial statements)



# Statement 3

## Statement of Remeasurement Gains and Losses

### For the year ended March 31

	2013	2012
Accumulated remeasurement gains (losses), beginning of year	\$ 423	\$ (2,825)
Unrealized gains (losses) attributable to foreign exchange	1,118	423
Amounts reclassified to the statement of operations	(423)	2,825
Net remeasurement gains (losses) for the year	695	3,248
Accumulated remeasurement gains (losses), end of year (Statement 1)	\$ 1,118	\$ 423

(See accompanying notes to the financial statements)

## Statement 4

### Statement of Change in Net Financial Assets For the year ended March 31

	Budget (Note 12)	2013	2012 (Restated)
Operating surplus (deficit) for the year (Statement 2)	\$ 694,415	\$ 959,522	\$ (55,194)
(Acquisition) of tangible capital assets	(477,900)	(517,678)	(650,183)
(Acquisition and transfer) of breeding herd	-	(117,238)	(96,522)
Amortization of tangible capital assets	-	377,926	368,791
Amortization of breeding herd	-	66,107	62,593
Proceeds of disposal of tangible capital assets	-	681	6,203
Proceeds of disposal of breeding herd	-	41,716	26,038
Net loss on the disposal of tangible capital assets	-	4,073	8,898
Net loss on write-offs of tangible capital assets	-	3,107	5,744
Net (gain) loss on the disposal of breeding herd	-	(4,638)	3,032
Net (acquisition) of tangible capital assets and breeding herd	(477,900)	(145,944)	(265,406)
(Acquisition) use of prepaid expense	-	(1,607)	4,909
(Acquisition) of inventory	-	(108,901)	(60,210)
Net (acquisition) consumption of other non-financial assets	-	(110,508)	(55,301)
Net remeasurement gains (losses) for the year (Statement 3)		695	3,248
Increase (decrease) in Net Financial Assets		703,765	(372,653)
Net Financial Assets, beginning of year		4,116,108	4,488,761
Net Financial Assets, end of year		\$ 4,819,873	\$ 4,116,108

(See accompanying notes to financial statements)

# Statement 5

## Statement of Cash Flows

### For the year ended March 31

	<u>2013</u>	<u>2012</u>
<b>Cash flows from (used in) operating activities:</b>		
Receipts from customers and others	\$ 16,731,058	\$ 10,447,970
Transfers from Government of Saskatchewan	995,000	995,000
Transfers from Government of Manitoba	259,682	259,682
Payments to suppliers and employees	(16,852,315)	(12,268,717)
Interest paid	(24)	(182)
Interest received	39,262	37,062
	<u>1,172,663</u>	<u>(529,185)</u>
<b>Cash flows from (used in) capital activities:</b>		
Purchase of tangible capital assets	(517,678)	(650,183)
Purchase and transfer of breeding herd	(117,238)	(96,522)
Proceeds from sale tangible capital assets and breeding herd	<u>42,397</u>	<u>32,241</u>
	<u>(592,519)</u>	<u>(714,464)</u>
<b>Cash flows from financing activities:</b>		
Receipt of capital grants from Government of Manitoba	<u>11,772</u>	<u>-</u>
Increase (decrease) in cash position	591,916	(1,243,649)
Cash position, beginning of year	<u>2,603,432</u>	<u>3,847,081</u>
Cash position, end of year	<u>\$ 3,195,348</u>	<u>\$ 2,603,432</u>
Comprised of:		
Cash	\$ 435,465	\$ 23,065
Due from General Revenue Fund	<u>2,759,883</u>	<u>2,580,367</u>
	<u>\$ 3,195,348</u>	<u>\$ 2,603,432</u>

(See accompanying notes to the financial statements)

# Notes to the Financial Statements

March 31, 2013

## 1. Status of Institute

The Prairie Agricultural Machinery Institute (Institute) is a body corporate operating under *The Prairie Agricultural Machinery Institute Act, 1999*. Its primary purpose is to perform tests and conduct research on machinery, equipment and technologies used in the agriculture, food and other industries. The Institute's testing facilities are located in Humboldt and Lanigan, Saskatchewan and Portage la Prairie, Manitoba.

On wind-up, any net assets will be divided between the Governments of Saskatchewan and Manitoba in proportion to their respective share in the Institute's assets equivalent to the percentage of funding provided to date by each province.

The Institute's objective when managing its capital structure, which consists of net assets, is to ensure adequate funding exists to support its operations and growth strategies. Capital is managed through grant funding and a \$700,000 available line of credit. The Institute does not have any long-term debt.

The Institute relies on funding from the Governments of Saskatchewan and Manitoba and on one customer for continued fee for service revenue. This customer accounts for 54% (2012 - 62%) of its fee for service revenue and 62% (2012 - 69%) of accounts receivable.

## 2. Significant accounting policies

Pursuant to standards established by the Canadian public sector accounting board (PSAB), the Institute is classified as an 'other government organization'. These financial statements are prepared in accordance with Canadian public sector accounting standards. The significant accounting policies are as follows:

### a) Financial assets

Financial assets are assets that could be used to discharge existing liabilities or finance future operations and are not for consumption in the normal course of operations. Valuation allowances are used where considered necessary to reduce the amounts reported for financial assets to their net realizable value.

Cash consists of cash on hand, balances with financial institutions, and Due from General Revenue Fund.

Accounts receivable consist of receivables from customers (trade accounts) and other receivables. Receivables are recorded at cost less an allowance for doubtful accounts.

### b) Non-financial assets

Non-financial assets are assets held for consumption in the provision of services. These assets do not normally provide resources to discharge the liabilities of the Institute unless they are sold. Tangible capital assets and other non-financial assets are accounted for as assets by the Institute because they can be used to provide services in future periods. Tangible capital assets are recorded at cost less accumulated amortization. Self-constructed assets are recorded at cost, including labour and materials. Amortization is recorded using methods and rates intended to amortize the cost of assets over their useful life.



	<u>Method</u>	<u>Rate</u>
Buildings	declining balance	5%
Equipment, furniture, and vehicles	declining balance	10%
Computer equipment	declining balance	30%
Leasehold improvements	straight line	10%
Computer software	straight line	33%

Prepaid expenses are prepaid amounts for goods or services which will provide economic benefits in one or more future periods.

The breeding herd is recorded at cost less accumulated amortization. This asset is being amortized at 20% declining balance.

Inventory of livestock and feed is recorded at the lower of cost and net realizable value. Livestock inventory cost is determined using the weighted average method and feed inventory cost is determined using the first-in, first-out method. Net realizable value is the estimated selling price in the ordinary course of business.

c) Financial instruments

The Institute's financial instruments include cash, Due from General Revenue Fund, accounts receivable, accounts payable and accrued liabilities, and unearned revenue. These instruments are recorded at cost or amortized cost. The carrying amount of these instruments approximates fair value due to their immediate or short-term maturity. Except as otherwise disclosed the Institute is not exposed to significant credit, currency, interest or liquidity risk arising from these financial instruments that may affect the amount, timing and certainty of future cash flows.

d) Government transfers

Government transfers are the transfer of assets from government agencies and are not the result of any exchange transactions, and there is no expectation to repay the amounts in the future or a financial return. Government transfers are recognized in the fiscal year in which events giving rise to the transfer occur, providing the transfer is authorized, any eligibility criteria have been met and reasonable estimates of the amounts can be made.

e) Revenue recognition

The Institute's operations are funded by the Government of Saskatchewan (Saskatchewan) and the Government of Manitoba (Manitoba) according to an agreement between the two provinces. Under Order in Council 1800/79, the Institute is not required to return the unused portion of the provincial transfers. The Institute recognizes provincial transfers when the transfer is authorized and eligibility criteria have been met by the Institute.

The Institute recognizes fee for service revenue when the related services are provided. It recognizes fee for service on contracts using the percentage of completion method. It records monies received prior to providing services as unearned revenue.

f) Basis of segmentation

The Institute has adopted the Canadian public sector accounting standards requiring financial information to be provided on a segmented basis. The Institute has been segmented by accountability center. Revenues that are directly related to the costs of the segment have been attributed to each segment.

The segments are as follows:

- **Corporate Services** provides for the administration of the Institute.
- **Saskatchewan Operations** is an applied research, design, development and testing segment. It serves the agricultural, industrial, transportation, military and other market sectors.
- **Manitoba Operations** is an applied research, design, development and testing segment. It serves the agricultural, industrial, transportation, military and other market sectors.
- **Western Beef Development Centre (WBDC)** applies and transfers beef research to improve profitability of the cow/calf sector of the beef industry.

g) Foreign currency translation

Monetary and non-monetary assets and liabilities prior to settlement that are denominated in foreign currencies are translated into Canadian dollars on the balance sheet date at the exchange rate in effect for that date and are recorded in the statement of re-measurement gains and losses. In the period of settlement, the cumulative amount of the re-measurement gains and losses are reversed in the statement of re-measurement gains and losses and an exchange gain or loss is recognized in the statement of operations. Revenue and expense transactions are translated at the approximate exchange rate in effect for that date and are included in the determination of net income for the year.

h) Measurement uncertainty

The preparation of financial statements in conformity with Canadian public sector accounting standards requires management to make estimates and assumptions that affect the reported amount of assets and liabilities and disclosure of contingent liabilities at the date of the financial statements, and the reported amounts of revenue and expenses during the period.

Accounts receivable are stated after evaluation as to their collectability and an appropriate allowance for doubtful accounts is provided where considered necessary. Accounts receivable includes fee for service revenue on contracts based on an estimate of the percentage of completion at the time of measurement. The measurement of materials and supplies are based on estimates of volume and quality. Amortization is based on the estimated useful lives of tangible capital assets. These estimates and assumptions are reviewed periodically and, as adjustments become necessary they are reported in earnings in the periods in which they become known.

The degree of uncertainty associated with the measurement of estimated amounts recognized in the financial statements is not material.

3. Due from General Revenue Fund

Due from General Revenue Fund is money held in a bank account included in the Government of Saskatchewan's Consolidated Offset Bank Concentration arrangement. The Institute receives interest on a quarterly basis from the General Revenue Fund calculated using the Government of Saskatchewan's thirty-day borrowing rate and the Institute's average daily bank account balance. For 2013, the average interest rate was 1.09% (2012 – 1.05%).

4. **Accounts receivable**

	2013	2012
Trade accounts receivable	\$3,994,879	\$3,270,626
Other	71,973	36,251
Allowance for doubtful accounts	(21,595)	(21,595)
Accounts receivable	<u>\$4,045,257</u>	<u>\$3,285,282</u>

5. **Accounts payable and accrued liabilities**

	2013	2012
Trade accounts payable	\$920,327	\$525,968
Wages and other personnel costs	824,228	422,001
Other	61,461	152,320
Accounts payable and accrued liabilities	<u>\$1,806,016</u>	<u>\$1,100,289</u>

6. **Breeding herd**

<b>Cost</b>	2013	2012
Opening balance	\$546,023	\$510,560
Additions and transfers	117,238	96,522
Disposals	(92,755)	(61,059)
Closing Balance	<u>\$570,506</u>	<u>\$546,023</u>
<b>Accumulated Amortization</b>		
Opening balance	\$295,650	\$265,045
Amortization	66,107	62,593
Disposals	(55,678)	(31,988)
Closing Balance	<u>306,079</u>	<u>295,650</u>
<b>Net Book Value</b>	<u>\$264,427</u>	<u>\$250,373</u>

The breeding herd consists of cows that are used for beef research in the operations of the Western Beef Development Centre.

7. **Inventory held for consumption**

	2013	2012
Livestock	\$268,879	\$152,751
Feed	56,298	63,525
Total	<u>\$325,177</u>	<u>\$216,276</u>

Inventory (recovered) in 2013 was \$(19,998) and in 2012 was \$(59,000).

8. **Accumulated Surplus**

Accumulated surplus represents the net financial assets and non-financial assets of the Institute.

Accumulated surplus is comprised of the following two amounts:

- Accumulated surplus from operations, which represents the accumulated balance of net surplus arising from operations of the Institute and allocations as detailed in the table below.
- Accumulated remeasurement gains and losses, which represents the unrealized gains and losses associated with foreign exchange.

Certain amounts of the accumulated surplus, as approved by the board, have been designated for specific future purposes. These internally restricted amounts are included in the accumulated surplus presented in the Statement of Financial Position.

Accumulated surplus from operations are as follows:

	March 31, 2012	Additions during the year	Reductions during the year	March 31, 2013
<b>Internally Restricted Surplus:</b>				
Bio-energy and processing	\$2,308,422	\$ 25,070	\$(199,597)	\$2,133,895
Government funded capital	2,010,015	11,772	(184,908)	1,836,879
	<b>4,318,437</b>	<b>36,842</b>	<b>(384,505)</b>	<b>3,970,774</b>
<b>Unrestricted Surplus</b>	<b>4,875,893</b>	<b>1,307,185</b>	<b>-</b>	<b>6,183,078</b>
<b>Accumulated Operating Surplus</b>	<b>\$9,194,330</b>	<b>\$1,344,027</b>	<b>\$(384,505)</b>	<b>\$10,153,852</b>

#### 9. Related party transactions

This financial statement includes transactions with related parties. The Institute is related to all Saskatchewan Crown agencies such as ministries, corporations, boards and commissions under the common control of the Government of Saskatchewan. The Institute is also related to all Manitoba Crown agencies because of the Government of Manitoba's participation in the operations of the Institute. In addition, the Institute is related to non-Crown enterprises that the Government of Saskatchewan or the Government of Manitoba jointly controls or significantly influences.

Routine operating transactions with related parties are recorded at the agreed upon rates and are settled on normal trade terms. Those transactions and amounts outstanding at year-end are as follows:

	2013	2012
<u>Financial statements category</u>		
Fee for service revenue	\$2,002,165	\$1,915,500
Other operating expenses	1,096,872	838,804
Accounts receivable	466,854	278,424
Accounts payable and accrued liabilities	216,164	104,302
Unearned revenue	261,501	582,581

The Institute has leased land from the University of Saskatchewan for a nominal amount until October 31, 2013. In addition, the Institute pays Saskatchewan and Manitoba provincial sales tax on its taxable purchases made in those provinces. Taxes paid are recorded as part of the cost of those purchases.

Other transactions with related parties and amounts due to/from them are described separately in the financial statements and the notes thereto.

#### 10. Pensions

The Institute's employees participate in the Saskatchewan Public Employees Pension Plan, a multi-employer defined contribution pension plan. Pension benefits are based on accumulated contributions and investment earnings. The Institute's responsibility is limited to paying the required employer contributions of 6% of regular salaries. Salaries and benefits include contributions of \$341,020 (2012 - \$300,697) which are funded from current operations.



## 11. Financial risk management

Risks have been identified and the Institute ensures that management monitors and controls them. The significant financial risks to which the Institute is exposed are:

### Credit risk

Credit risk is the risk that one party to a financial instrument will cause a financial loss for the other party by failing to discharge an obligation. The Institute is exposed to credit risk on the accounts receivable from its customers. In order to reduce its credit risk, the Institute applies sound credit practices. The Institute incurred insignificant bad debt expense during the past five years.

### Market risk

Market risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in market price. Market risk is comprised of currency risk and interest rate risk.

#### Currency risk

Currency risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in foreign exchange rates. The Institute is exposed to currency risk on its cash, accounts receivable, and accounts payable. The Institute does not use any derivative financial instruments to alter the effects of this risk.

The Institute enters into transactions denominated in United States currency for which the related revenues, expenses, accounts receivable and accounts payable balances are subject to exchange rate fluctuations. As at March 31, 2013 the following items are denominated in United States currency (\$ CAD converted at \$1 USD - 1.0167 CAD (2012 - 0.9975)):

	2013	2012
Cash	\$(3,305)	\$(27,096)
Accounts receivable	-	-
Accounts payable	206,712	53,059

#### Interest rate risk

Interest rate risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in market interest rates. The Institute's exposure to interest rate risk is limited to the line of credit and trade payables. The interest rate on this debt is variable; therefore, the Institute may face increasing interest costs in an increasing interest rate market.

### Liquidity risk

Liquidity risk is the risk that an entity will encounter difficulty in meeting obligations associated with financial liabilities. The Institute's exposure to liquidity risk is dependent on the receipt of funds from its operations, external borrowings and other related sources. Funds from these sources are primarily used to finance working capital and capital expenditure requirements, and are considered adequate to meet the Institute's financial obligations.

## 12. Budget

The budget for 2012/2013 was approved by the Board on April 26, 2012. The budget figures are presented for comparison purposes.

**13. Adoption of new accounting standards**

Effective April 1, 2012, the following sections from the PSAB standards have been adopted:

- Foreign currency translation-Section PS 2601  
This section establishes standards on how to account for and report transactions that are denominated in a foreign currency. An exchange gain or loss is now recorded in the Statement of Remeasurement Gains and Losses until the period of settlement when it is recognized in the Statement of Operations. The Institute applied this standard retroactively resulting in an adjustment to the 2012 opening accumulated remeasurement loss of \$2,825 and a net increase in 2012 expenses of \$423.
- Financial instruments-Section PS 3450  
This section establishes standards on how to account for and report all types of financial instruments.
- Financial statement presentation-Section PS 1201  
Establishing general reporting principles and standards for the disclosure of information, this section applies in the same period that Sections PS 2601 and PS 3450 are adopted.

These standards have affected disclosure requirements.

**14. Contractual obligations and contingencies**

The Institute has committed to provide future services to several research and development projects. At March 31, 2013, the value of these services totals \$ 234,606 (2012 - \$250,563).

Lease terms on vehicles, equipment and land range from 3 to 7 years. In 2013, these lease costs totalled \$74,982 (2012 - \$69,013). The Institute is required to make the following minimum lease payments on these leases:

2014	\$ 13,470
2015	10,001
2016	9,991
2017	7,578
2018	1,092

Under contract with Western Canada Testing Inc. (WESTEST), the Institute manages and operates WESTEST under the direction of WESTEST's Board of Directors for a certain percentage of the service fees from WESTEST clients. During the year, the Institute earned fee for service revenue of \$467,841 (2012 - \$203,634) from WESTEST. At year-end, accounts receivable includes \$171,026 (2012 - \$76,591) due from WESTEST.

At year-end two actions were outstanding against the Institute. The ultimate outcomes are not yet determinable and accordingly, no liability has been recorded in the financial statements. One action is litigation by the Institute against a client for non-payment of amounts owed. The second action is litigation against the Institute relating to research analysis, reporting and comments made publicly by the Institute.

**15. Change in accounting policy**

In 2013 the Institute retroactively adjusted the ABC deferred grant revenue. Previously, the ABC grant was deferred until spent for the purpose designated in the funding agreement. These grants do not meet the criteria for deferral as liabilities, and therefore have been recognized as grant revenue. The adjustment has resulted in the following impact; an increase to 2012 opening

accumulated operating surplus of \$2,635,725, an increase to 2012 opening net financial assets of \$2,635,725, and a decrease in 2012 revenue of \$327,303.

**16. Comparative figures**

The financial statements for prior periods, including comparative information have been restated to conform to current year's presentation.

## Schedule of Tangible Capital Assets As at March 31

	Asset Cost				Accumulated Amortization				Net Book Value			
	Opening Balance	Additions	Disposals	Write-downs	Closing Balance	Opening Balance	Amortization	Disposals	Write-downs	Closing Balance	2013	2012
Land and Improvements	\$ 279,841	\$ -	\$ -	\$ -	\$ 279,841	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 279,841	\$ 279,841
Buildings	5,209,763	84,298	-	-	5,294,081	2,839,764	122,716	-	-	2,962,480	2,331,601	2,370,019
Equipment and Furniture	2,987,651	320,531	-	(2,328)	3,305,854	1,640,276	166,782	-	(2,240)	1,804,818	1,501,036	1,347,375
Vehicles	507,218	47,282	-	-	554,500	340,554	21,394	-	-	361,948	192,552	166,664
Computer Equipment	580,986	17,793	(39,975)	(50,604)	508,200	475,757	34,575	(35,362)	(47,444)	427,526	80,674	105,230
Leasehold Improvements	124,164	47,082	-	-	171,246	44,151	17,125	-	-	61,276	109,970	80,013
Computer Software	58,716	692	-	-	59,408	36,447	15,334	-	-	51,781	7,627	22,269
Total	\$9,748,359	\$517,678	\$(39,975)	\$(52,932)	\$10,173,130	\$5,376,949	\$377,926	\$(35,362)	\$ (49,684)	\$5,669,829	\$4,503,301	\$4,371,411



## Schedule of Segment Disclosure For the year ended March 31

	Corporate Services		Saskatchewan		Manitoba		Western Beef Development Centre		Total	
	2013	2012	2013	2012	2013	2012	2013	2012	2013	2012
<b>Revenue</b>										
Provincial Transfers:										
Government of Saskatchewan										
Ministry of Agriculture										
- operating	\$ 320,000	\$ 320,000	\$ 310,000	\$ 310,000	-	-	\$ 365,000	\$ 365,000	\$ 995,000	\$ 995,000
Government of Manitoba										
Department of Agriculture, Food and										
Rural Initiatives										
- operating	30,000	30,000	-	-	229,682	229,682	-	-	259,682	259,682
	350,000	350,000	310,000	310,000	229,682	229,682	365,000	365,000	1,254,682	1,254,682
Fee for service	-	-	13,682,960	8,361,957	2,327,016	1,517,899	1,045,170	826,349	17,055,116	10,706,385
Interest income	13,826	9,856	25,456	27,206	-	-	-	-	39,262	37,062
Other income	112	1,537	347,046	166,142	20,311	22,877	135,058	175,427	502,517	365,983
<b>Total Revenues</b>	<b>363,938</b>	<b>361,393</b>	<b>14,365,412</b>	<b>8,865,285</b>	<b>2,577,009</b>	<b>1,770,458</b>	<b>1,545,228</b>	<b>1,366,976</b>	<b>18,851,587</b>	<b>12,364,112</b>
<b>Expenses</b>										
Fee for service direct costs	-	-	6,380,305	2,691,116	597,810	408,070	415,424	421,222	7,394,539	3,526,418
Personnel	820,042	692,154	5,056,280	4,184,216	1,248,702	978,803	813,455	649,732	7,940,479	6,504,915
Administration fee (recovery)	(862,736)	(548,863)	692,883	431,272	117,594	76,264	52,359	41,327	-	-
Administration	99,222	222,767	742,566	576,407	245,814	227,359	(11,278)	58,304	1,076,694	1,285,337
Operating	33,563	45,287	518,557	445,119	104,371	98,486	251,478	155,863	907,969	744,555
Amortization	5,000	5,000	272,763	277,013	36,481	38,324	123,789	111,247	444,033	431,384
Lease - land and equipment	176	1,437	45,969	46,324	22,438	13,030	229	2,362	68,832	62,863
Exchange costs	71	-	47,396	15,898	-	832	2,118	2,341	16,271	10,271
Loss on disposal of assets	-	-	7,180	8,897	-	5,744	4,221	4,668	11,401	19,309
Honoraria	4,366	1,950	-	-	-	-	5,765	2,725	10,121	4,675
Bad debt	-	-	-	26,397	150	-	-	-	350	26,397
Interest expense	-	182	-	-	-	-	-	-	24	182
	24	-	-	-	-	-	-	-	-	-
<b>Total expenses</b>	<b>99,728</b>	<b>419,714</b>	<b>13,794,289</b>	<b>8,702,689</b>	<b>2,373,360</b>	<b>1,864,912</b>	<b>1,666,460</b>	<b>1,449,991</b>	<b>17,903,837</b>	<b>12,419,306</b>
<b>Surplus before capital grants</b>	<b>264,210</b>	<b>(58,321)</b>	<b>601,123</b>	<b>162,596</b>	<b>203,649</b>	<b>(76,454)</b>	<b>(121,232)</b>	<b>(63,015)</b>	<b>947,750</b>	<b>(55,194)</b>
Capital grants	-	-	-	-	11,772	-	-	-	11,772	-
<b>Surplus for the year</b>	<b>\$ 264,210</b>	<b>\$ (58,321)</b>	<b>\$ 601,123</b>	<b>\$ 162,596</b>	<b>\$ 215,421</b>	<b>\$ (76,454)</b>	<b>\$ (121,232)</b>	<b>\$ (63,015)</b>	<b>\$ 959,522</b>	<b>\$ (55,194)</b>





**PAMI Corporate Services**  
 Box 1150, 2215 8th Avenue  
 Humboldt, SK S0K 2A0  
 P: (306)682-2555, 1-800-567-PAMI  
 F: (306) 682-5080  
[pami@sasktel.net](mailto:pami@sasktel.net)

**PAMI Saskatchewan**  
 P: (306) 682-5033  
 F: (306) 682-5080

**PAMI Manitoba**  
 Box 1060, 390 River Road  
 Portage la Prairie  
 P: (204) 239-5445  
 F: (204) 239-7124  
[portage@pami.ca](mailto:portage@pami.ca)

**WBDC Main Office**  
 Box 1150, 2215 8th Avenue  
 Humboldt, SK S0K 2A0  
 P: (306) 682-3139  
 F: (306) 682-5080  
[info.wbdc@pami.ca](mailto:info.wbdc@pami.ca)

**WBDC Research Ranch**  
 Box 700  
 Lanigan, SK S0K 2M0  
 P: (306) 365-3366  
 F: (306) 365-3374  
[humboldt@pami.ca](mailto:humboldt@pami.ca)

[www.pami.ca](http://www.pami.ca)  
[www.wbdc.ca](http://www.wbdc.ca)  
[www.westest.ca](http://www.westest.ca)